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SIR T. PERCY NUNN.
1870—1944.

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SIR PERCY NUNN

BY H. R. HAMLEY

THE death of Sir Percy Nunn on December 12th, 1944, at Funchal, Madeira, has deprived British education of one of its most powerful minds and British educational psychology of one of its most original and stimulating exponents. He was an original member of the British Psychological Society and was the first Chairman of the Education Section.

Thomas Percy Nunn was born in Weston-super-Mare on December 28th, 1870. In his early education he was guided by his father, Dr. E. S. Nunn, himself a schoolmaster who encouraged him to follow the lines of his own interests. His interests seem to have been many, for even as a boy he showed something of that versatility of mind which remained one of his strongest characteristics through life. He often spoke of his early efforts to teach himself trigonometry, one of the higher mysteries in those days, and how he found practical applications of the triangle formulæ by measuring the distance of the Flatholm and Steepholm from his bedroom window at West-super-Mare or the width of the River Severn from a piece of level ground not far from Bristol. Some of the problems he devised at that time he included in his course of " Boy Scout Geometry " with which he delighted his pupils a few years later when he was called upon to teach mathematics in school. Another subject which interested him as a boy was geology, which he followed up in the Bristol University College (not then a University) under the stimulating guidance of Lloyd Morgan. Once, when asked what he had carried away from Bristol, he remarked: "A geological hammer and a keen interest in philosophy and psychology." His examination record was not outstanding. He did not, as his mathematics students used to think, obtain a ' first ' in mathematical honours ; he obtained a Pass B.Sc. degree of the University of London by external examination, one subject out of four being mathematics. Some years later he took a second degree, this time in Arts, his main subjects being Latin and Greek. This he did, as he often expressed it, " purely for pleasure."[1]

By this time the pattern of his mind was beginning to take shape ; it was that of the realist philosopher whose main concern it was to reconcile psychological with scientific judgments, " to reconcile judgments of common-sense with those involving scientific hypotheses." His method of enquiry at all times was to examine as carefully as possible the *data* of experience in the expectation that he would be able to educe the *principles* which seemed to hold the data together. He was realist enough to see that even in physical science the primary data may be complicated by psychological elements, that even in an act of scientific analysis or discrimination there is a *motive* present which ' has to be reckoned with.' This theme, which recurs again and again in his writings, formed the subject of his first substantial contribution to knowledge, *The Aims and Achievements of Scientific Method*, which he presented as a thesis for the D.Sc. degree of the University of London in 1906.[2] In the preface to the book he tells us that " the results . . . were reached in the course of a study of the problems of Science teaching in schools and are believed to have very definite pedagogical applications."[3]

He began his teaching career in 1891 in a secondary school in Halifax, where he was, to use his own words, " very much a general practitioner." He used to tell his students that, in his first post, his main concern was to learn the art of class management but he soon discovered that the first essential of class management was an understanding of the

[1] For some of the above details I am indebted to Miss Elsa Nunn, Principal of the Diocesan Training College, Fishponds, Bristol. I am also indebted to Miss Margaret Punnett, many years Sir Percy Nunn's colleague at the London Day Training College, for details of his teaching career.

[2] This was published by Macmillan and Co. in 1907.

[3] It is not generally known that in his early teaching days Sir Percy published two books on School Chemistry, one in collaboration with E. Barrett, in which the scientific method was given full play.

child's intellectual interests. His next post was in London, where the joined the William Ellis School as Science Master and Second Master in 1893. It was not long before he became responsible, not only for the Science teaching in the School, but also for the teaching of mathematics. During the next ten years he developed methods of teaching which were to revolutionise the teaching of mathematics in this country. Incidentally, he sent a stream of keen young mathematicians to the universities, more than one of whom became Wranglers and later University Professors of Mathematics. Once again his method was to go to the foundations of the subject and from the *data* of mathematics to formulate the *principles* upon which the teaching of the subject should be built. In 1912 he stepped right into the forefront of the world's teachers of mathematics when he read a paper on *The Calculus as a Subject of School Instruction* before the Fifth International Congress of Mathematicians. The paper was very warmly praised by Felix Klein, the noted German mathematician, who was the recognised leader of the reform movement in Germany.

In 1903 he came on to the staff of the London Day Training College and from then until 1905 he acted as part-time lecturer; at the same time he was on the staff of the Shoreditch Technical Institute as Science Master. In 1905 he became a full-time member of the staff of the London Day Training College and a year or two later the Vice-Principal for the men students, the Vice-Principal for the women students being Miss Margaret Punnett. From that time on his story is one of steady emergence as perhaps the leading mind and personality in our educational world. In 1913 he was appointed Professor of Education in the University of London; he held the Chair until his retirement in 1936. In 1922, on the retirement of John Adams (later Sir John Adams), Nunn was appointed Principal, to the great satisfaction of his friends. When, in 1933, the London Day Training College was transferred to the University, Nunn became its first Director.

During the twenty years which followed his appointment to the 'London Day,' his output of creative work was truly amazing. He was an active member of several academic societies and made notable contributions to all of them. He was Chairman of the Education Section of the British Psychological Society in 1919, of Section L of the British Association in 1923, of the Mathematical Association and of the Aristotelian Society in the same year. At the same time he served on important councils of the University and of the Colonial Office and was in constant demand as a lecturer all over the country. Doctorate honours came to him from three British universities.

It was during this twenty-year period that he published a number of books of fundamental importance on a variety of educational subjects. Reference has already been made to his doctorate dissertation on *The Aims and Achievements of Scientific Method.* This was an expansion of a paper read before the Aristotelian Society *On Causal Explanation* in 1906. Science is here considered, not as an abstract study of natural phenomena but as "a conative process distinguished in and traced through the conscious life of civilisation." This passage has been quoted because it represents his attitude on many subjects of human enquiry. His conclusion is that "the aim of the scientific process as it occurs in the individual is to render the Objective (which consists of psychical as well as physical existents) intelligible. This happens when primary facts (which are the same for all) enter into an 'apperceptive system.'" Another paper on *The Concept of Epistemological Levels* read before the Aristotelian Society in 1908 is interesting to educationists, for in it appears the first statement of his wonder-utility-system theory which he expounded so persuasively and demonstrated so effectively to his students. Still pursuing his conception of Science as a conative system he writes: "The second moment in the evolution of the scientific system is reached when naïve curiosity and wonder enter into the wider affective aspect of conative systems aiming at practical control over Nature in the material interests of man;" until finally we reach the stage of "systematisation which is at first merely an expression of the effort to make practical control more complete."

In 1914 appeared his monumental work on *The Teaching of Algebra,* accompanied by two volumes of *Exercises.* This great work, worthy of a place among the classics of educational literature, has exerted a profound influence on the teaching of mathematics, not only in England but in every English-speaking country. One has only to compare present-day

text-books in mathematics with those of thirty years ago, when Nunn's *Exercises in Algebra* was in the making, to realise the truth of this statement. *The Teaching of Algebra* is a treatise, the first comprehensive treatise, on the concept of functionality in school mathematics; it is more, it is a treatise on functional thinking in life: "Mathematical truths have always two sides or aspects. With the one they face and have contact with the world of outer realities lying in time and space. With the other they face and have relations with one another."

Two other contributions to mathematics, not as well known as the *Algebra*, appeared during this period. The first was *Relativity and Gravitation*, published in 1923. This was based on a series of lectures given to soldiers during the war of 1914-1918. Those soldiers must have been tough in mind as well as in body! It is almost unbelievable that anyone should have found time to master the mathematics of relativity in the midst of the many activities in which Nunn was at that time engaged. The second contribution of note was a paper on *The Sequence of Theorems in School Geometry*, published in the *Mathematical Gazette* in 1922. It is hardly a secret that this paper formed the basis of a Mathematical Association *Report on the Teaching of Geometry* (1923), in which appeared ideas which were revolutionary even for such a progressive body as the Mathematical Association. Here, again, one is struck by Nunn's knowledge of mathematical philosophy and of his keen psychological insight. In place of the 'parallel postulate,' or Playfair's Axiom, which generations of intelligent schoolboys have accepted with more than resentment, Nunn substituted the easily acceptable "Principle of Similarity," that "any figure can be reproduced anywhere on any enlarged or diminished scale." If, then, we grant that a photograph can be enlarged or reduced without doing violence to the accuracy of the portrait, we can prove all the regular parallel theorems of the text-book.

A record of Nunn's scientific interests would hardly be complete without some reference to astronomy. From boyhood he had been intrigued, not so much by the configuration of the stars as by their movement, and he set himself to find out how they did move. This he did very successfully, in his own ingenious way. Towards the end of his life he returned to the subject and, in two articles to the *Mathematical Gazette*, one on *The Elliptical Orbit of the Earth* (1941) and the other on *The Celestial Cylinder* (1943) he substituted for the intricate equations of the text book in astronomy simpler forms that a mathematically-minded secondary schoolboy could easily negotiate. No one would think, after reading these articles, that they had not been written by a young man in the first flush of his mathematical discoveries. And there is the same old irrepressible humour in them, as when, for example, he puts a mathematical conclusion into words: "Venus draws somewhat more freely upon the privilege of her sex, and Mercury, compared with the rest of the family, is a wild fellow."

Before we leave this record of Nunn's scientific enquiries, reference should be made to three methodological principles which he always kept before him as guides in his practical procedures. The first was to be guided by the child's natural interests—and what trouble he took to discover them; the second was to follow the psychological order of presentation rather than the logical when there seemed to be a conflict between them—but that did not happen very often; and the third was to trust to the historical order of development when deciding between two equally valid methods of presentation—and many a clue to the correct order he obtained in this way. Numerous examples of these three principles are to be found in his *Algebra* (e.g., his treatment of the Calculus and the Exponential) and in concrete form in the remarkable science and mathematics museum which he and Miss Punnett brought together in the old L.D.T.C.

The twenty-year period of Nunn's creative activity culminated in the publication of his *Education, its Data and First Principles* (1920), which in the twenty-five years that have since elapsed has gone through some twenty or more impressions and editions. A third revision was completed and the final proofs corrected just before his death. Perhaps it is true to state that no single book on the principles of education has influenced the thought of English students of education so much as Nunn's *Data*. Whether they agreed or disagreed with it, understood it or gave up the struggle, they had great respect for it. It could hardly be

otherwise, for it paid them the compliment of making a considerable demand upon their understanding. In the course of his discussion of the data of education and the principles which emerge from the data he passed in review most of the schools of psychology which seemed to have a contribution to make to our understanding of the growth and development of the human being. The central theme of the book is stated in the preface to the second edition thus: "To assert the claim of individuality to be regarded as the supreme educational ideal, and to protect that ideal against both the misprision of its critics and the incautious advocacy of its friends." Nunn has been criticised in some quarters for his neglect of the social aspect; it has even been asserted that in his view only the individual can be taken as 'given.' It is true that the central theme of the book is 'the individual,' and the author was unrepentant about that emphasis up to the last, but it is not true that the social was altogether ignored. In the first chapter he states: "The idea that social bonds are imposed upon the individual from without and accepted under the terms of a 'social contract' has, in fact, long been exploded. It is now recognised universally that they originate within man's nature and are woven inextricably into the texture of his being." In other words, community is given in the nature of things, an assumption that is quite in accordance with modern sociological theory. "No Thoreau could hide himself so deeply in the woods as to escape from the social in his own soul."

Another criticism of Nunn's *Data* is that it was written from the point of view of the scientist rather than from that of the artist. Such criticism is contrary to the facts. He admits that the data of education are scientifically discerned but he insists that in applying and interpreting the data the teacher must of necessity enter the realm of art. The opening words of the *Data* are worth repeating here: "'Every art,' said Aristotle in his famous exordium, 'is thought to aim at some good.' Now education, as we shall consider it in this book, is certainly an art." In this respect education is like the science, and the art, of medicine.

The careful reader of the book finds himself carried on by a constantly recurring theme. Once again it is the concept of functional development. Born with the will to live the individual finds himself impelled by a deep developmental urge to attain the highest self that nature and circumstance can secure. Since the *Data* was first published educational thought has swung from the development of the individual to that of the society in which he lives. It will turn again, perhaps with a deeper understanding of the social that is within the individual. Society has to be redeemed rather than made.

As we review the life and the life work of Sir Percy Nunn, it is borne in upon us that he was first and last a teacher. His incursions into philosophy, far-reaching as they were, did not begin with the need to satisfy his intellectual curiosity but with the desire to explore the foundations of the subject that he had set himself to teach. And what an experience it was to see him calling forth the thinking power of children. As one child remarked, after a successful struggle with map projections, with more sincerity than elegance of diction: "My, don't he clean your brain." This he did for many a youthful scientist and mathematician, as he did later for many a student of education. He was a great teacher and as a teacher he wanted to be known.

And what shall we say of the man himself? At least we can say of him, as of all truly great men, that the influence of his life far exceeded that of his work. An oft-quoted passage from one of his books is as true of him as of the heroes of whom he wrote: "The prime contribution of the heroes of science to the world's cultural wealth is not the scientific method but the scientific life. Our business, then, is to teach the realisation of the life, not the mastery of the method." This Sir Percy Nunn exemplified to the full, in his zest for knowledge and truth, in his integrity of mind and heart, in his appreciation of the highest cultural and spiritual values, and in his courage and faith in the face of so many and great difficulties. This is not the time for a final evaluation of his life and work. In making that final account we shall have to include the inspiration that thousands of individual students and teachers have received in their quest for a deeper insight into the nature of things and for confidence and faith in the ultimate issues of life.

THE PSYCHOLOGY OF TEACHING AND TEACHER TRAINING.

A REVIEW IN RELATION TO THE McNAIR PROPOSALS.[1]

By A. PINSENT.

I.—*Implications for the teaching profession of the McNair Report. Need for reconsideration of the content and method of education and professional training of secondary teachers.* II.—*The essential objective in teaching.* III.—*The essential process in teaching.* IV.—*The professional training problem.* V.—*The general problem of mental adaptation.* VI.—*Educational and professional training of secondary teachers. Content and method.* VII.—*Summary.*

I.—Introduction.—Implications of the McNair proposals.

The proposals of the McNair Report,[2] if translated into practice, will initiate revolutionary changes in the teaching profession. By ' revolutionary ' I mean changes which will make traditional attitudes and concepts inadequate. The profession viewed as a whole presents the following appearance. There are four main groups of teachers and of schools, namely, private preparatory and 'public'; State secondary; technical and trade; State elementary. The teachers in these groups tend to be recruited from different social castes and there has been little effective inter-communication between them. They have had characteristic forms of education and training, and they possess, quite unmistakably, characteristic attitudes.[3]

For teachers in the State service the McNair Committee recommend " that the Ministry of Education should recognise only one grade of teacher, namely, the grade of ' qualified teacher ' and that, subject to the Ministry having discretion to accord such recognition to persons with good academic or other attainments, a qualified teacher should be a teacher who has satisfactorily completed an approved course of education and training." Further, it recommends that " there should be a basic salary for qualified teachers."[4]

These recommendations imply equality of professional status irrespective of specialisation in academic knowledge or type of service. This principle is already an accepted commonplace in other professions. Medical specialists in diseases of children, mental abnormality, or surgery, are not accorded lower professional status on that account. Comparison of educational with medical work indicates the absurdity of arranging grammar-school teachers, teachers of juniors, of mental defectives, and of handwork and art in a descending order of professional status.[5]

The McNair proposals, together with the reorganisation foreshadowed by the Education Act of 1944, will tend to remove the bars to free circulation of teachers within the State service and will, therefore, shift the main emphasis in the preparation of teachers from academic or technical specialisation to professional knowledge and skill, an overdue reform. Hence, it seems desirable at this stage to attempt to work out what should be included in a common basic professional curriculum and training. Moreover, it should now be practicable, and I think it is desirable, to investigate methods of vocational selection and guidance for the purpose of advising prospective teachers concerning the branches of service in which their intellectual aptitudes, temperaments, interests, and general experience will find most congenial and efficient expression.[6]

[1] I wish to acknowledge with thanks my indebtedness to Professor Valentine and Mr. W. D. Wall for reading the original draft of this paper, and for their criticisms and constructive suggestions.

[2] *Teachers and Youth Leaders*, H.M.S.O., 1944.

[3] The crop of letters and complaints which has followed the recent publication of draft salary proposals by the Burnham Committee is significant in this respect.

[4] See *Report*, p. 142, para. 8, sections (*b*) and (*e*).

[5] More correctly, it would be absurd in any rationally organised system in which a basic standard of education and professional training would be a necessary condition for service in any branch of the system.

[6] In the past the only vocational advice likely to be taken seriously by many students was to get some sort of honours degree and teach in a grammar school.

II.—The essential objective in teaching.

There is no lack of literature about teacher-training; rather an *embarras de richesse*. A spate of books, pamphlets, memoranda, and special reports has poured from English and American sources during the past forty years. However, this literature has been singularly barren in certain respects. The discussions have been expressed in terms and concepts which changes in social conditions and advances in psychology and sociological knowledge have made obsolete. They have tended toward dialectical wrangles and special pleading, while contemporary experimental knowledge has been ignored. It would seem to be more promising to try to state our necessary educational objectives as exactly as possible, and to analyse teaching situations into their essential processes concerning which we know already, or can find out on experimental grounds, the optimum efficient conditions. Such analysis may provide clearer indications about the knowledge and skill necessary for efficient teaching, and the way in which they should be learned and practised by prospective teachers.

In the first place we have to note the complex function of knowledge and skills in the cultivation and professional training of teachers.

Each teacher needs knowledge and skills for his own full personal development and satisfaction. No permanently dissatisfied person with warped or arrested intellectual or emotional development can be an efficient teacher. Therefore, the minimum amount and quality of knowledge and skills required for any particular department of teaching is not necessarily adequate for the full efficiency of any given teacher. By restricting his equipment to just what he may be required to teach we make at least partial inefficiency inevitable. It is too often and too lightly assumed that teachers in nursery, infant and junior departments, and in some branches of technical instruction, do not need more than a narrow range of general knowledge, the length and scope of their education being curtailed accordingly. This is why much teaching is, intellectually and æsthetically, so insufferably dull. Moreover, it does not follow that the knowledge and skills most conducive to the teacher's full personal development and satisfaction will coincide exactly with what he is required to teach. It is conceivable that a teacher *as a person* craves poetry, music, or philosophy, while his immediate professional concern is mathematics, chemistry, engineering or carpentry.

In the next place, experience, and particularly academic knowledge and skills, are a teacher's stock-in-trade, so to speak, the actual medium of his professional activities. But a teacher acquires them at levels of difficulty, and in logical arrangements characteristic of specialist studies in university, training college or technical institute. In many cases the academic education is completed before professional training begins, even before a student has considered the possibility of teaching as a career. These conditions encourage a lack of effective connection between personal education and future professional work, in that a frame of mind may be induced and habituated in the student which will conflict with that needed for full efficiency in the same person as teacher. The teacher's primary objective, as *educator*, is not the transfer of elements of his own knowledge and skills in the mode of organisation in which he originally acquired them to a set of identical pupils. For several reasons that is impossible. His primary objective is the *optimum educational development and well-being of each individual pupil.*

III.—The essential process in teaching.

If we accept this primary objective we must define the conditions of optimum educational development and well-being, and then decide what is the essential process in teaching which has that objective in view.

Education is an evolutionary process. Each individual begins life as an embryo relatively unspecialised in structure and function, but with intrinsic potentialities. Development into an adult proceeds through a series of progressive changes, each of which depends on the fulfilment of the one before it. Optimum development and well-being are determined by two sets of influences. One set consists of the physical and sociological environments. The individual in a given geographical region is a member of a community with

characteristic social and economic structure, interests, manners and beliefs to which he must be, not completely, but effectively adapted. At the same time he is a biological and psychological organism with intrinsic laws and rhythms of development. As such he is not infinitely adaptable, and, therefore, the physical and sociological environments must be adapted in turn to the needs of the organism. Full development requires a complex interaction between these two sets of influences. If the optimum relation between them is not achieved development may be abnormal or may cease altogether.

Some part of the adaptation to the sociological environment is achieved by means of the school curriculum.. Subjects of study as a whole are samples of the total pool of knowledge and skills available to the community at any given epoch. But subjects are never included in school syllabuses in their entirety. Certain parts only of each subject are selected. If we select with the optimum development of pupils in view then the selection must be determined in a complex way by three sets of conditions, the two already mentioned in the last paragraph, and the intrinsic logical and æsthetic characteristics of the subject matter itself.

Thus, the work of selecting a curriculum and introducing the pupils to it requires a complex process of intellectual reorganisation and mental adaptation on the part of the teacher. The different branches of knowledge cannot be learned or taught in haphazard way, particularly in the secondary stage of schooling. To be fully intelligible they must be introduced to the pupils with some due regard to their intrinsic logical and æsthetic characteristics. In the next place, if learning is to be fully educative, i.e., conducive to the development of intellect, character, and personality, the pupil concerned must be able to master his work. But the pupil's aptitudes are manifested during his schooldays in varying degrees of immaturity. Therefore, both syllabuses and teaching methods must be adapted to each pupil's aptitudes and to the degree of maturity reached at the time of teaching. Thirdly, present learning is conditioned by past experience and attainment. Future careers must be sought in the characteristic sociological conditions of the community of which the pupil and the school are a part. What a pupil learns, and how he learns it, must be related to these requirements, some of which do not become operative until the school career is completed.[1]

The essential process in teaching now becomes evident. To generalise the argument we have to recognise that an efficient teacher does not supply all the educative material out of his own stock. He organises reading, projects, practical activities of all kinds. He encourages pupils to supplement their in-school experiences by out-of-school enterprise. This does not mean, however, that he must stand aside in an attitude of benign indifference. Sooner or later problems of logical order, systematisation of studies, vocational objectives, will arise which can only be solved efficiently by a teacher capable of regarding elementary work from an advanced standpoint. A conspectus of the whole course in relation to the pupil's psychological traits and sociological needs is necessary before the optimum arrangement of the various samples of experience represented by the school curriculum can be estimated. By the nature of things it is impossible for an immature pupil to have this conspectus. Therefore guidance is necessary. Many pupils even at the adolescent stage appear to have neither the imaginative capacity nor the inclination to organise their own courses when the school offers them the opportunity to do so. They demand guidance from their teachers.

Thus, with our objective in view, the essential process in teaching and the condition for maximum teaching efficiency seems to be *the reorganisation and adaptation of all relevant*

[1] Sociological considerations become increasingly important during adolescence. P. I. Kitchen, in his book *From Learning to Earning*, in which he describes the development of the Rugby Day Continuation Schools, says : " Educationists soon discover that the instruments, weapons and techniques of full-time schools are not fully effective in the new field of operation (i.e., in day continuation school work) ; that work (for which wages are earned) has introduced into the lives of pupils interests, outlooks, and standards of value of much power and great significance. The teacher who cannot adapt his technique to use these interests ; who cannot see life in colours approximately the same as those of youth ; who cannot refer learning to youth's daily experience ; soon loses caste and is about as effective with his industrial pupils as a rifleman opposing a tank " (Page 120).

experience, including the teacher's own knowledge and skills, to accord with the pupil's optimum educational development and well-being, as this is determined by psycho-biological factors, and by sociological conditions.

The function of professional knowledge and training must be to maximise the prospective teacher's ability to carry on this process of mental reorganisation and adaptation.

IV.—The professional training problem.

If the effects of physical or psychological immaturity are unknown or ignored, and if sociological conditions are static, then no professional training, as such, will be deemed to be necessary. The curriculum will be taught according to its intrinsic academic or technical structure in a form most conducive to the long-term fixed sociological requirements. The traditional organisation of the classics was an example. The syllabus defined by ancient authority was repeated in grammatical order for university entrance tests and higher classical studies. A grammar-school pupil could go to the university and return to a grammar school to teach the orthodox syllabus in the orthodox way without further training. His university degree was his licence to teach. *Mutatis mutandis* the same held good in the case of the master craftsman.

These conditions are no longer operative. We know too much about the conditions and importance of development to ignore it. Societies the world over are changing rapidly. In this country the new administrative proposals will tend to break down the exclusiveness of professional teaching groups. Adaptability, therefore, will be a most important trait in teachers. Even if the professional training is specialised, e.g., into primary and post-primary work, it will still be impossible to prepare teachers specifically for all the local economic and social environments in which they may serve, or for all the individual pupils they will be required to teach. Teaching practice in the training period must be restricted to experience in two or three schools, amplified by visits to a few others. The theory can include only selected aspects of pedagogy, psychology, hygiene and social studies. It is not possible, even if it were desirable, to deal exhaustively with these subjects in the time available. Therefore, what the student in training learns in the training context must be applied at a later date in the particular contexts of the various teaching situations in which he will be occupied. In conditions of free circulation the two contexts may be markedly different. Thus, it appears that the authorities responsible for professional training have to deal with a variant of the familiar problem of transfer of the effects of training. This is the essential problem of professional training in modern conditions.

Fortunately, this hoary problem has been clarified, so far as intellectual conditions are concerned, by experimental investigation. The main findings may be summarised as follows:

(*a*) Mere practice—that is, learning by memorisation and acquiring dexterity by repetition—undertaken in one context, offers no guarantee that it will be applied efficiently in a different context. In fact, slight changes in context may be followed by marked loss of efficiency. Simple mechanical transfer of an item of information or of procedure does not appear to happen. Changes of context induce qualitative changes in our modes of apprehension.[1] When a person 'trained' by repetition has to work in changed conditions he tends to proceed as if the second situation were identical with the first, and applies his habits unchanged with corresponding loss of efficiency.

(*b*) Effective 'transfer' occurs only when the trainee can recognise *explicitly* whatever common components in the different contexts are relevant to the task in hand. In other words, the essential condition seems to be that both training and test situations must be recognised explicitly as variants of the same standard concepts.[2] It follows therefore that

[1] It frequently happens that even a quite familiar object is not recognised or passes completely unnoticed in an unfamiliar setting.

[2] For example, that the method of calculation indicated by the question, "How many times is 56 contained in 2,000?" is long division, since both long division and the question concerned imply a process of continued subtraction; or that Hannibal's military elephants were the counterparts of modern tanks.

the training most conducive to transfer and adaptability is not routine practice but instruction in correct ways of attending, analysing, and abstracting. The adaptable person must be able to analyse the various contexts in question and infer correctly that they are all manifestations of the same law, principle, method of procedure, etc.

Thus in the conditions implied by the Education Act of 1944 and by the McNair Report, it will not be sufficient merely to arrange longer periods of teaching practice, as some devotees of the so-called school-centred training seem to advocate. That may lead to the establishment of a set of attitudes and habits characteristic of one type of school which may not be applicable to schools and pupils of a different type. It will not be sufficient to present to the prospective teachers formal theoretical courses in academic subjects, or in sociology, psychology, biology. Much of this material may be quite irrelevant to teaching situations; in addition to which, the main objective of the students may be to pass an academic examination. This point cannot be ignored when considering adaptability, since the purpose for which learning is undertaken exerts an influence upon the mental organisation of the subject-matter learned and the manner of learning. The purpose tends to organise a selective frame of mind. Neither is it sufficient to take the students through a course in teaching method, modern or otherwise. In the absence of an analysing attitude and ability, experienced teachers as well as students-in-training may make the acquaintance of a new method, assume that it is *the* correct and absolutely perfect method for all occasions and conditions, then apply it unmodified to their own school, often with disappointing results. The adaptable teacher must be able to pick out the essentials of a teaching situation, and of a theory or method in relation thereto. The problem of professional training is to raise this analysing capacity in each student to the highest degree of ability of which he is capable.

V.—THE GENERAL PROBLEM OF MENTAL ADAPTATION.

So far, so good. We have now to consider the psychology of teaching. What is involved in a teaching situation? Educational psychology has been directed almost exclusively to problems of learning, training and testing. Little explicit attention has been paid to the psychology of a teaching situation. One reason for this lack may be a distaste for traditional class teaching. The usual picture is that of a hard-faced dominie driving and harassing a group of unhappy frustrated pupils through a carefully prescribed syllabus toward an examination. As a reaction from this, there has been a strong tendency to insist, dogmatically, on pupil self-activity (meaning, usually, self-directed activity) as the only possible alternative. Any deliberate influence of the teacher seems to be regarded by some experts as positively baneful, an unwarrantable interference with the rights and liberties of pupils.

Extreme views on this matter, are, I believe, mistaken, particularly in the case of normal children. Even in the most informal teaching situations *guidance* is necessary. The pupils themselves quite often demand it.[1] Extreme informalism, improperly called freedom, seems to be capable of producing exasperation, frustration, and emotional maldevelopment as surely as does over-organisation. Immature pupils cannot take sufficient account of long-term objectives; and, if we are to believe the findings of 'depth' psychology, they do not and cannot understand their own motives. Lack of good guidance at critical points in their development leaves them confused. Confusion breeds feelings of insecurity, lack of interest, and of self-confidence. These in turn cause anxiety which interferes seriously with efficient learning and satisfactory personality development.

It is necessary, therefore, to consider what is a proper relation between teacher and pupils.

A teaching situation is, of course, a social situation. As such it involves imitation, suggestion, formation of group sentiments and other familiar aspects of social psychology. The essential relation in teaching, however, seems to be that of dominance—submission. Instead of denouncing all class-teaching and all teacher-influence out of hand, it would

[1] Kitchen, in the book cited, describes how some adolescent pupils in tones of complete exasperation asked "Must we do as we like again to-day?"

seem more profitable to enquire what is the optimum proportion between dominance and submission, and *what makes a pupil teachable.* Let us deprecate by all means the production of cowed fearful pupils who lack self-confidence and independent initiative. At the same time it is equally reasonable to deprecate the production of completely aggressive irresponsible hooligans. There are two kinds of hooliganism. Moral hooliganism is the irresponsible defiance of social conventions and moral values. There is also intellectual hooliganism, that is, the calculated defiance of fact, truth and intellectual honesty.[1] It is essential that pupils be trained to submit to the discipline implied by established fact, canons of scientific thinking, and standards of intellectual and æsthetic value.

At the same time it is certain that immature pupils have not an adequate capacity for complete scholarly and moral disciplines. They approach full development in stages. The early stages seem to consist in a pupil's identification of himself with some person who represents the desirable intellectual and moral values and objectives. The pupil accepts the teacher before accepting the teacher's standards and attitudes. Two factors are involved in this psychological identification and acceptance, namely, affection (in its commonly accepted meaning), and *prestige.* Both are necessary.[2]

The teacher's part in this social relation is first to cultivate the affection and respect of the pupils and then to wean them from their naive identification with, and acceptance of himself, to a rational identification with and acceptance of desirable intellectual and moral standards.[3] The establishment of this relation is essential in both teaching and learning. Without some degree of it no teacher can teach because no pupil is teachable, in any type of teaching situation, formal or informal.[4]

How can the relation be cultivated? It depends to some extent on physical and temperamental characteristics. Between some people it seems to be established almost instantaneously. Between others it requires long and skilful cultivation. In a teaching situation, development of the relation to an optimum degree requires that the pupil shall feel, with conviction, that the teacher sympathises with, and *understands* him. For professional teaching this factor of understanding is essential. Some people assert that interest in (love of) children is all that is necessary for success. I cannot accept this optimistic view. Directed and informed interest is essential for full efficiency.

I will call this relation of sympathetic understanding 'rapport.'

The possibility of cultivating rapport raises the general problem of mental adaptation. We have asserted that adaptability is the most important qualification in teachers. Adaptability requires that the teacher be capable of analysing variable teaching situations correctly. The cultivation of rapport means that one aspect of any teaching situation to be analysed is another human being. Before any knowledge and skills can be adapted to the needs of a given pupil we must be able to estimate correctly what those needs are. But a human being is not a machine, or a logical argument to be taken to pieces at convenient times, examined, and then reassembled. We cannot delve directly into a pupil's intellectual and emotional processes. We can observe only physical appearances, behaviour signs, and responses to specific test situations. Therefore, understanding the pupil, in our use of the term, requires that the teacher must be *sensitive to significant signs and responses, and capable of interpreting them correctly.*

These interpretations, however, particularly when concerned with motivation and emotional conditions, depend ultimately on the teacher's own experiences. If he has not some personal experience sufficiently similar to that of the pupil concerned it is difficult to see how the interpretations can be either adequate or correct. The necessary basis of interpretation is not available even though a method of observation and interpretation may have been learned by routine practice. This emphasises our earlier contention that

[1] Cf. the influence of Nazi and Fascist ideologies in education and scholarship.

[2] When children get to the stage of verbal expression one may hear a teacher described somewhat as follows: "Old X, delightful old thing, but a bit of a joke, really. Impossible to take him (or her) seriously."

[3] That is, of course, so far as they are intellectually capable of rationalisation. Many people never get beyond naive acceptance because they lack the capacity to do so.

[4] See, for example, Paneth, *Branch Street.*

the range of any teacher's personal experience needs to be much wider than that represented by the syllabuses he has to teach. But it is not sufficient for the teacher merely to have lived through experiences which are taken for granted and allowed to remain as undifferentiated possibilities in a fused background of feeling. To be effective for rapport the experiences must be analysed, explicitly recognised, and their possible significance comprehended.

At the same time we know that habituation in a particular environment tends very powerfully to organise a frame of mind peculiar to that environment, which acts as a selective operator in all subsequent observations and interpretations. The effect of a given environment is cumulative. Many of the most influential formative experiences happen in early childhood before analysis and critical evaluation are possible. The difficulty we are discussing has to be taken into account in work in the physical sciences. It is much more intractable when one person tries to understand the psychological condition of another reared in a social and economic environment widely different from his own. It is obvious that conditions of free circulation in the teaching profession will maximise the difficulty at least during the immediate future.[1]

That the ability to understand other human beings can be improved by training seems to have been denied, at least by implication, in some Gestallt psychologies. Kohler,[2] for example, says that although we may understand our fellowmen very well we do not do so explicitly, in ordinary life, by making inferences about their psychological condition by analogy with our own experiences. On the other hand, Spearman[3] claims that the psychological relation is apprehended and analysed in the same way is as any other class of relations. This difference of view is relevant to the training problem.

Both sides appear to be correct, the difference arising from the fact that they are referring to different aspects of the process in question. Most people have, in some degree at least, what might be called a psychological (or social) intelligence. They appear to be able to assess the feelings and motives of their fellows and adapt their own responses thereto. This facility is, I suspect, a most important component in the make-up of the 'born' teacher. But, in ordinary life, much of this adaptation remains at an unconscious level. The persons concerned may not know how they make their adaptations, or even that they are actually doing so. The process remains fused, as it were, within the total experience. To this extent Kohler is correct. But it does not follow that the facility cannot be raised to the level of explicit awareness by appropriate training. The case of medical psychologists is some indication that it can. The function of training is not to create an aptitude for this understanding but to raise the mental processes involved to the level of explicit awareness and make them available for use in variable contexts.

The Gestallt objections have arisen out of an opposition to any kind of associationist doctrine. Discussions of what may be called 'simple transfer' have, for the most part, assumed tacitly that a state of mind consists of an *assembly* of parts and connections arranged in transferable (or transposable) patterns on the analogy of electrical apparatus. Recent work in neurology as well as the findings of Gestallt and psycho-analytic investigators make this assembly hypothesis untenable. It seems much more likely that mental processes depend on dynamic systems in which the function of each component is determined by its context. In that case the question will arise—how can experience be analysed into standard concepts freed from the influence of particular contexts which, we said earlier, is a necessary condition for adaptability? The difficulty is more verbal than actual. It is due mainly

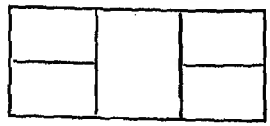
[1] It may be argued that in a classless society there would be no need to take account of difficulties in mental adaptation in training teachers. This is doubtful. The gross differences between social strata and type of education would be minimised, but there would still remain differences in frame of mind due to mental endowment, home influence, geographical situation and special vocational interests. Moreover, the greater the difference between level of intellectual capacity and special talent, and between maturity and immaturity of development, the more difficult it becomes for a teacher to understand a pupil. Teachers in nursery, infant and junior schools need training in rapport, apart from the accidents of social class.

[2] *Gestalt Psychology*, p. 182.

[3] *Abilities of Man*, pp. 179-181.

to rather different meanings of the term ' analysis.' The function and effect of training may be illustrated by a few examples.

Glance at the figure immediately below. At first we note a set of marks on a neutral background. This would seem to be the naive experience. Common knowledge suggests



a set of straight lines arranged as a pattern of oblongs. Geometrical training enables us to discern six rectangles with specific characters and relations. If now we are told to find in the figure the initials of the writer of this paper, two subsidiary configurations appear to be organised and to emerge within the original pattern. If the verbal instruction fails to organise the correct sub-systems in opposition to the influence of the total pattern a drawing of the actual shapes intended will make the 'analysis' sufficiently explicit: 日 日[1]

The process is reversible. If the original figure should be presented subsequently as part of an exercise in geometry we should fail to ' see ' the initials under the influence of the wider geometrical context. It is easy to find examples in reading. I had read the word-pattern ' attendances ' thousands of times before I realiscd, with mild surprise, that it could be read as ' at ten dances.' The occasion for the reorganisation was a clue in a cross-word puzzle, " Takes the floor two hours before midnight."

Examples instructive for our purpose abound in the history of scientific research and invention. Correct insight into the mode of circulation of the blood was delayed for many years because contemporary observers approached the problem with frames of mind dominated by experiences of the ebb and flow of tides, and of irrigation in current agricultural practice. What put Harvey into the correct frame of mind was a model of the recently invented mechanical pump with its no-return valves. This seems to have been a case in which the conceptual sub-system needed for ' transfer ' was organised by an accidental experience. Pumps, for reasons quite unconnected with anatomy or physiology, had become ' news ' in Harvey's time. Furnished with a comprehension of the set of relations of valves, pressures, and currents represented by a mechanical pump, Harvey could then ' see ' the same conceptual system in a heart in spite of its different perceptual appearance.

Another case is even more significant for our purpose. The concept of goitre as a deficiency disease due to lack of iodine was suggested by Chatin about 1850, but it was rejected decisively by French medical opinion at the time on the ground that Pasteur had proved that all disease had a bacterial origin. In this case emotional factors appear to have played a part in fixing a frame of mind antagonistic to the suggestion, Pasteur's prestige, for example.

These examples indicate that analysis and abstraction, though not in the manner implied in associationist doctrine, is practicable. The function of the training is three-fold: In the first place the observer must be *sensitised* to the fact that there is a problem to be solved and induced to seek a solution. Secondly, the ' clues ' (which may be supplied by accidental occasions, or by deliberate intent in the course of training) organise the available experiences of the trainee into sub-systems with a form appropriate to the analysis, and then direct his attention explicitly to the significant aspects of the situation to be analysed. Finally, apprehension and abstraction (i.e., recognising explicitly the correct sub-systems within the total context) are facilitated by practice in a *variety* of situations relevant to the purpose of the training.

For the purpose of understanding pupils, attention must be directed explicitly to (*a*) significant behaviour signs and responses in children and young people; (*b*) significant

[1] As an illustration of the dynamic effects in observation, it is interesting to note that after the initials have been ' discovered ' in the pattern the whole *looks different*. It seems to be the two letters on a neutral background within a rectangular frame, rather than a pattern of oblongs.

components in the observer's own experiences; and (*c*) the effects on observation and interpretation of the observer's own environment and frame of mind. Self-analysis is an essential factor in all psychological analysis.

VI.—EDUCATION AND PROFESSIONAL TRAINING OF SECONDARY TEACHERS—CONTENT AND METHOD.

What should be the *content* and *method* of the education and professional training of teachers for the reorganised secondary schools? By 'method' I do *not* mean a course in pedagogy but the way in which all their academic and professional subjects should be arranged and the training conducted. The preceding analysis applies to any branches of teaching but our most urgent problem at the moment is secondary education.

The new administrative proposals indicate *secondary* education for *all* pupils over the age of eleven years; and equality of status for all qualified teachers. If we accept the principle that the primary objective in teaching is the optimum educational development and well-being of individual pupils, then the objective of the education and training of prospective secondary teachers (in addition to their own personal cultivation) must be to maximise their ability to understand their pupils and make the mental adaptations we have indicated above.

First, with respect to content. Our argument indicates three primary ingredients in a *minimum* basic qualification, namely (*a*) a subject or group of cognate subjects covering some part of the revised secondary curricula; (*b*) psychology and hygiene; (*c*) social studies. This represents what each teacher *must* know, to which we ought to add self-knowledge, i.e., explicit awareness of his own temperament, interests, emotional fixations which tend to restrict mental adaptation.

In the new conditions, however, it will not be necessary for all secondary teachers to have the three primary ingredients in the same proportions. The relative proportions for maximal efficiency will depend on different teaching situations. We must reformulate our notions of secondary education. Hitherto, it has been deemed to consist of the education of a set of intellectually homogeneous pupils according to a primarily linguistic grammar-school programme. This tradition has already become unworkable.[1] Native differences in general intellectual capacity and special talents determine different vocational potentials in pupils which require appropriate curricula and teaching methods.[2] These differences will tend to become more rather than less important in a free society since there will be, in that case, no social-class bars to vocational preferment.

High academic attainments will be required in pupils whose aptitudes fit them for high-grade work and leadership in the professions, in industry and agriculture, and in public administration. For these pupils advanced secondary and university education is essential. Another section of pupils, while not equal to the demands of university studies, will be capable of profiting by systematic technical education. A third group will be able to undertake only a simpler type of schooling. Evidence from the report on the Rugby Day Continuation School is pertinent here. The pupils mentioned were those who had remained in the elementary schools after the intellectually more able children had been selected by the secondary school entrance examinations at the age of eleven years. "We now recognised," says the author, "that the growing and loud demands from young people, parents, and employers for some technical training could not and ought not to be ignored . . . One-third of our boys and one-third of our girls . . . were clearly destined for ambitious careers in engineering or building, office or shops. They, their parents, and employers recognised this and clamoured loudly and persistently for appropriate technical training . . . We now felt it reasonable to give our 'A' classes from one-sixth to one-third of their school time to suitable technical training . . . The position in regard to the *remaining two-thirds of* the pupils was not so clear, *for their future careers could not as a rule be predicted, and perhaps*

[1] See the Norwood Report, *Curriculum and Examinations in Secondary Schools*, p. 10.

[2] I am not unmindful of the value of what we call, rather loosely, a general education, but, nowadays, we cannot make any hard and fast distinction between general and vocational education.

for this very reason, vocational interests were not so intense. Such desires as they had for vocational training, where they expressed them, which was not often, took the form of complaining that there was nothing in school to help them in their jobs. However, another third of the boys was probably destined for some of the humbler occupations in engineering or building industries for which it was appropriate to give them an industrial course. The remainder were occupied in and about shops, so we arranged for them courses in retail distribution ; but in this sphere there was so much change of occupation and *the particular jobs had so little skill attached to them that they did not form a good foundation upon which to build technical training. The remaining two-thirds of the girls were following occupations for which technical training was neither a major interest nor a practical proposition,* but, as most girls are ultimately destined for a future concerned with home-management, these girls were given a housecraft course with half the course spent on home-making subjects."[1]

We need an adjective for these pupils found to be unsuitable for systematic technical education which will describe their educational status without introducing derogatory implications. Possibly ' non-specialised ' is as good a term as any, and better than ' modern,' which seems not to mean anything at all, very precisely.

Hitherto, the legitimate claims of this non-specialised group have been ignored in our secondary system, the criterion of value being, in the main, specialised scholastic aptitudes and attainments. But these non-specialised young people may be developed into satisfactory persons and useful citizens by suitable educational treatment. Thus, one important question is, in view of the need for rapport, can grammar-school-and-university-trained teachers make the mental adaptations necessary for dealing adequately with these groups ? It seems doubtful, without appropriate preparation. Some will argue that a university education is a sufficient guarantee of adaptability. Possibly ; but in any case, only on two conditions ; first, that the universities perform their proper function, that is, pay adequate attention to the encouragement of critical attitudes, and to the accurate discernment of concepts and values ; second, that the students have first-class brains. Neither of these conditions has by any means universal distribution. Universities, nowadays, tend to pay over-much attention to technical specialisation for examinations and research purposes ; and we can be quite certain that not all secondary teachers will be first-class students. We have to face the certainty that we cannot count on sufficient *spontaneous* adaptability to meet the needs of the new school conditions. This means, I think, that some degree of specialisation of the education of secondary teachers must be envisaged.

The grounds for such specialisation are : Type of knowledge and skills needed by the pupils ; level of difficulty at which they must be taught ; and the form of arrangement of the studies best suited to the intellectual capacities and interests of the different groups we have indicated. In addition, there are the teachers' intellectual and temperamental endowments and predominant interests. In the case of pupils who should have university or higher technical education, type of studies, level of difficulty, and form of arrangement will be determined by sociological factors, and prescribed in detail by the examinations and trade tests which must be passed before the pupils can be admitted to a particular vocation. The prospective university entrants will be taught, naturally, by university graduates with the necessary academic qualifications. The prospective technicians must be taught, equally naturally, by men and women who have the special knowledge and skills, and successful experience in conditions of industrial or commercial occupations.

For teachers of these specialised groups, academic and technical qualifications of the required type and level must have priority in their training. The degree of mental adaptation and reorganisation needed for their teaching situations will be relatively small. Psychologically, their teaching problems will be simpler ; they will have the intellectual pick of the adolescent population with careers more clearly defined, vocational interests strong, incentives powerful, capacity and will to learn relatively high. Both teachers and pupils will have similar interests, similar objectives, and will tend to have

[1] KITCHEN. Book cited, p. 47 (italics mine).

similar frames of mind. The professional education and training of these teachers should include: discussion of the ultimate aims of education; social studies designed to clarify the function of the schools and their own special subjects with relation to citizenship and to the general economic and social well-being of the community; psychological studies with particular reference to the course of human development, to adolescent and adult interests and modes of learning, and to the pedagogy of their special subjects.

The case of teachers of non-specialised pupils will be markedly different. The level of academic and technical knowledge among the pupils will be low; careers ill-defined; vocational interests slight and vague; incentives weak; intellectual power and will to learn small in comparison with the other groups. In the years of transition we may expect passive resistance if not active opposition to extended schooling. Moreover, for some time ahead, perhaps permanently, the adolescents in this group will tend to be recruited, predominantly, from the socially least efficient sections of the general population with what that means in terms of lack of ordered home life, poor housing conditions, and weak social consciousness. It is probable that this group will present a relatively high proportion of intellectual and emotional problems and behaviour difficulties. The mental adaptation required from the teachers will be extensive, and the sheer professional interest and skill very much higher than in the more specialised branches of secondary work. Compared with the work of these teachers, sixth-form and higher technical teaching is relatively easy, so far as technique is concerned.

Hence, it seems to me, for teachers of non-specialised pupils, professional knowledge and training must have priority over academic qualifications. They will need much more comprehensive courses, both theoretical and practical, in social studies; in general and social psychology (including an introduction to 'depth' psychology); in hygiene and physical *education*, particularly remedial work; and in methods of teaching and school organisation, with particular reference to the forms of arrangement of the simple academic and technical knowledge required by their pupils, most appropriate to interests and learning capacity, that is in the form of practical activities, projects, topics, hobbies, discussions similar to everyday situations in the lives of the pupils. Interest and skill in games, gymnastics, dancing, drama, *speech-training*, arts and crafts, music, social activities should have a high place in these teachers' qualifications and training. To this list I would add some deliberate training in clear thinking. If this aspect of education is treated merely as an incidental matter to be acquired in the course of other studies then, in far too many cases, no explicit realisation of either the importance of clear thinking or of its more obvious methods is produced. I attach great importance to this aspect of training. The arts of discussion and collective thinking; the ability to recognise crooked misleading thinking in modern propaganda to which pupils will be exposed are most important in preparation for citizenship in a democratic social and political framework, and the people who most need expert training are those with the least capacity to think clearly for themselves.

I find considerable resistance to this suggestion in some educators, possibly because they can still remember, with distaste, formal courses in symbolic logic and 'technical' philosophy. There is not the slightest need, however, to mention logic in connection with this training. It can be organised in the form of studies of advertisements, selling propaganda, newspaper reports, political speeches; as practical observations of ways in which the pupils are likely to be misled in everyday life. This could be made into an attractive, instructive and amusing course.[1]

So soon as a basic minimum salary becomes a fact, the absence of a degree qualification, or some diploma with equal status, in some secondary teachers may give rise to controversy in the teaching profession. This is no insuperable difficulty however. If the point of view of this paper is accepted, and, given the determination in the responsible authorities to organise the appropriate measures for training, degree or diploma courses can be drafted for intending teachers of non-specialised secondary pupils consisting of (*a*) a *group* of

[1] There is no lack of literature as a guide, e.g., Thouless: *Straight and Crooked Thinking*; *Straight Thinking in War-time*. Stebbing: *Thinking to Some Purpose*. Jepson: *Clear Thinking*. The topics could be connected with English Studies, Current Affairs, General Science, and Religious Education.

teaching subjects, e.g., English Studies; History with Geography and Anthropology; General Elementary Science with Mathematics; Religious Education; Arts and Crafts; Music; (*b*) Social Studies; (*c*) General and Social Psychology with Hygiene. The courses can be made as thorough as the time allowed for training and the aptitudes of the students will permit. Such schemes would compare favourably with many of the degree schemes now pursued by university students for general form work in grammar schools, and they would be very much more valuable for non-specialised secondary work in the new conditions. It is even arguable that they would be more valuable *as disciplines* than some specialised university courses for students with good but not first-class intellectual aptitudes. Degree or equivalent diploma schemes of this type seem to me to be absolutely essential in administrative conditions of equal status and salary for three reasons—educational efficiency; peace, goodwill and unity within the teaching profession; and the self-respect of teachers of non-specialised pupils.

So much for content. With respect to method in the meaning here intended, two aspects of the problem need consideration. Part of the answer has been indicated in previous sections. The teachers must be made explicitly aware of pupils' behaviour signs and responses, of their own personal experiences, and of the effects of environments in organising frames of mind. This awareness is best developed by living in different types of environment, by *comparative* social and anthropological studies,[1] and by directed discussion. A period of non-scholastic work in a social environment different from one's own should be a necessary part of any teacher's professional education.

A second aspect of this topic is the best arrangement of academic studies for teachers of non-specialising secondary pupils.[2] We have to ask whether university-trained teachers can make the mental adaptations necessary without further training. As students they will be predominantly products of a grammar type of secondary education. From their early youth they will have been habituated into a scholastic atmosphere where learning is supposed to be its own reward, and valued, ostensibly, for its own sake. In actual fact their studies will have been arranged, immediately in preparation for an academic examination; ultimately as a foundation for future specialised university work. Now, the objectives of the university scholar and teacher are what is usually described as the disinterested pursuit and dissemination of pure fundamental knowledge together with the mental disciplines and special skills involved therein. For the typical university teacher and research worker, first-hand experience is valued mainly as empirical evidence, the raw material out of which can be derived formal concepts which are the vehicles of mature thinking, and the mental 'tools' for further research. Their dominant objectives are formal closely-integrated systems of concepts expressed in special symbols. As soon as possible the concrete data of experience are discarded as likely to be misleading.

The intellectual power and social prestige of this attitude gives it high value as an incentive, and the examination system with its grades of honours provides it with a structural framework. But this fact constitutes an educational danger since a high degree of intellectual aptitude is needed for adequate mastery of the work, and more students are forced into it than can develop satisfactorily therein. Lacking the power of understanding the connections between the systems of formal concepts and the experiences and problems of everyday life the less able students tend to memorise symbols and verbal formulæ mechanically, and this process, as we have seen, is just the condition which is least productive of 'transfer' and adaptability. Situations in everyday life are treated by such students as if they were the special problems for which verbal answers have been memorised. In terms of the teaching situation all pupils in the secondary schools are likely to be treated as if they were potential university students and research workers irrespective of their limitations and real needs.

[1] Cf. BENEDICT: *Patterns of Culture*. MEAD: *The American Character*.

[2] This is relevant to the two alternative minority reports of the McNair Committee, the main difference between which "lies in the part which should be played by the universities" in the education and training of teachers. *Teachers and Youth Leaders*, p. 48.

On the other hand what will be the condition of the non-specialising pupils who will be directed, compulsorily in the new schemes, into secondary education. They will lack the power of conceptual and symbolic thinking. They will be interested, mainly, in what they can succeed in, namely, practical concrete activities and social affairs. They will acquire best what learning they need, not in preparation for some distant objective such as a formal examination or university degree, but in short-range practical activities closely connected with their home life, hobbies and possible occupations. "There is much to be said . . . for freeing more but not yet all of school life especially of the less ambitious, less talented young people from the dark shadows of distant examinations and the necessity of trying to remember for future use all that one learns. There is a thrill in certain school experiences . . . and life is richer for the thrill whether or not we can reproduce the details afterwards. Tradition recognised this in games, drama, concerts, literature, etc. But cannot young people likewise enjoy freely without the chilling thought of examinations the thrill of designing and making a pretty gown, a working wireless set, a model aeroplane; of cooking and serving an attractive meal; or of participating in an exciting scientific demonstration or a lively discussion."[1]

Will university-trained graduates make the necessary mental adaptations in sufficient numbers and to the extent needed for the success of the new schemes, *spontaneously*? The verdict of experience is negative. As we have seen, mental adaptation is not merely a matter of intellectual reorganisation. Habit and emotion at unconscious levels fix frames of mind of which the person concerned is not even aware, and therefore cannot, spontaneously, control. Thus, the mental adaptation which is indicated in the teaching of the non-specialising secondary pupils may not be accomplished in practice *even by teachers who recognise its desirability in theory*. Courage and confidence are also involved. I find that many students tend to revert in practice to methods of teaching and classroom organisation in which they themselves were reared, although they know about alternatives. The methods appear to have worked very well in their own cases; they are comfortably familiar; they may have been used by a favourite teacher with whom the student is still naively identified. Moreover, in the early days of reform when the inertia of tradition is strong, it is not sufficient to make a new system work. It must work with an agreement-compelling success, which will over-ride prejudice.

Thus, particularly in a period of transition, it seems desirable that prospective teachers of non-specialising pupils *should acquire some part at least of their own academic education in arrangements similar to those which they will need in their professional work*. This, of course, is not a new principle. It is merely a modification of the way in which teachers for secondary grammar and technical schools have always been educated! We shall need teachers for the reorganised schools who have confidence and facility in what may be called the appropriate educational idiom *before* they begin their professional career. They will then have their point of view well-established and there will be fewer lapses into a wrong type of orthodoxy. This course seems especially desirable in the case of the proposed emergency training schemes which, according to present plans, will be so lamentably short.

Thus I would suggest that each college tutor propose certain typical projects to be worked out in co-operation with a group of students with particular reference to the needs of a specified set of pupils. Later individual students should be required to select some project of their own and indicate in permanent form how they would organise it in a given teaching situation. It should not be impossible to arrange for such completed project-sketches to be submitted as part contributions for the final diploma. If something like this is not done there will be a danger that the reorganised secondary education may become the same old system with a new set of labels.

The locus of the training is important. I fear that many university departments would look askance at such training, and say, with some justification, that it was not their proper function. On the other hand, we have seen how very important it is that teachers should be freed from the restrictive effects of one circumscribed environment. This

[1] KITCHEN. Book cited, p. 78.

freedom is possible only if their experiences and social contacts are sufficiently varied. Therefore, we cannot look with favour on the segregation of prospective teachers in seminaries where they meet only students of the same type of experience, same outlook, interests, and prejudices. From this point of view the more varied intellectual and social contacts of the university are desirable.

There is one further complication, namely, the age at which a student should choose teaching as a career. Some of the suggestions made above cannot be implemented if the choice is not made until the academic education has been completed. There has been a strong tendency of late to urge that students should postpone their choice until they are ready for the year of professional training. This tendency, I think, can be over-rated to the detriment of professional efficiency. Abolish the *pledge* to teach by all means. But I can see no more reason for postponing choice of career in the case of teachers than of doctors, dentists, architects, engineers and other professional groups. And, if a sound but not first-class student did elect to take a course in a group of academic subjects at a more elementary level, plus social studies, plus general and social psychology, organised as I have suggested, and then decided not to teach, he or she would, I think, be better qualified for many careers in industrial, administrative, or social work than comparable students with an orthodox university degree scheme.

This paper raises more problems than it answers. However, it is doubtful whether definitive answers to many of the problems implicit in the new educational conditions are possible at the moment. Compromises are inevitable. The most important task at this stage of educational development is the analysis and clarification of educational objectives and processes. Then, when compromises have to be made, there is some likelihood that they will be made in a right rather than wrong direction.

VII.—Summary.

1.—Proposals of the McNair Committee imply equality of status and free circulation within the teaching profession. Such conditions will tend to displace the main emphasis in the preparation of teachers from academic or technical specialisation to professional knowledge and skill, and will raise the problem—what should be included in a common basic professional qualification?

2.—The primary objective in teaching should be the optimum educational development and well-being of individual pupils.

3.—Optimum development is determined by a proper relation between intrinsic characteristics of the living organism and the physical and social environments. School curricula must be adapted to pupils' psychological condition and sociological needs. Therefore, the essential process in teaching, in the new administrative arrangements, will be intellectual reorganisation and mental adaptation in the teachers.

4.—Intellectual reorganisation is involved in the process of professional training since there can be no guarantee that arrangements of studies in the students' own education will be identical with conditions of teaching. Therefore, the training must be conducted with due regard to the known conditions for optimum transfer. A summary of these conditions is given.

5.—Optimum degree of transfer requires ability to analyse and abstract standard concepts in variable contexts. Efficient teaching requires that teachers understand pupils, i.e., observe and interpret correctly their psychological conditions. Can this ability be improved by training? This question introduces a general problem of mental adaptation. Understanding, in the meaning referred to here, depends on personal experience and frame of mind, which are determined for each individual by environment. Can understanding be established between individuals reared in different environments? Influence of context and frame of mind on observation and interpretation. Is analysis possible on Gestallt principles? Examples. Influence of unconscious factors. How offset? Modifications required in principles of simple transfer.

6.—Reconsideration of content and method of arrangement of academic and professional studies for secondary teaching. Primary ingredients essential in a minimum course. Relative proportions of each primary ingredient required for different aspects of secondary teaching in new administrative conditions. Is specialisation of education and training required for secondary work? Grounds for specialisation. Alternative degree schemes for teachers of non-specialised pupils in secondary schools.

7.—Method of arranging studies for teachers of non-specialised secondary pupils. Frame of mind encouraged by university conditions compared with that characteristic of non-specialised pupils. Adequate spontaneous mental adaptation on the part of all teachers doubtful. Suggested arrangement to facilitate adaptation in teachers and consequent improvement in understanding pupils. Importance of locus of training—university or training college? Relevance to alternative minority reports of McNair Committee.

THE EDUCATION OF ILLITERATE ADULTS.

By CYRIL BURT.

I.—*Definition and Frequency.* II.—*Causes and Remedies.* III.—*Principles of Treatment.* IV.—*Summary.* V.—*References.*

I.—Definition and frequency.

The Educational Relapse of the Backward Adolescent.—During the last two or three decades teachers and educational authorities have devoted increasing attention to the dull and backward with a demonstrable measure of success. As recent surveys have shown, by the age of fourteen, the scholastic attainments of the less intelligent pupils are far higher than they were twenty years ago, at any rate in the more progressive areas. A boy with an I.Q. of about 75 or 80, who in 1913 would have left school with attainments corresponding to standard I or II, now leaves with an ability to read, spell, write, and compute equivalent to the old standard III or IV. But it would be a grave mistake to judge the success of our teaching methods solely by the performances of such pupils while still under the teacher's eye. The proper touchstone rather is: What will be their educational standard when fully grown up?

Few educationists have raised this question. Hitherto the evidence chiefly available has consisted of data procured incidentally in the course of investigations on slightly different problems—e.g., after-histories of dull or backward cases followed up into adult life, or test-results obtained by research-students with access to clubs and settlements for working men or women. Elsewhere I have briefly summarized the main conclusions (1, 2). The same inference seems to emerge from all these studies. The majority of those who were definitely backward at school, and a further proportion of those who were below average intelligence without being dull or backward in the technical sense, tend, during the five or ten years that follow the date of leaving school, to show a steady deterioration in nearly all the subjects of the elementary curriculum. So far as generalization is possible, the decline seems least in the arithmetic of everyday affairs (e.g., money-sums incidental to household or personal shopping), and greatest in reading, spelling, and English composition. Much of what was learnt at school is almost wholly forgotten; and a believer in formal training might be tempted to declare that not only do their intellectual faculties come earlier to an arrest, but during the years of adolescence seem actually to atrophy by disuse.

Early in the present war it was realized that this tendency, if at all widespread, might prove a serious handicap to a freshly raised conscript army (cf. 3, 4, p. 194 and refs.); and inquiries were set on foot to discover, by more extensive investigations, what was the frequency of illiteracy in the fighting services and what kind of remedies could be devised. There can be little question that, when released for publication, the analysis of data obtained in this way from tests and inquiries among recruits will be of profound importance to teachers engaged in elementary education and to those concerned in the problems of youth and adolescence.[1]

Definition of Illiteracy.—The common notion of illiteracy—a notion still shared by many educationists and administrators—is expressed by the definition given in the Oxford Dictionary: One who is "ignorant of letters, unable to read." That, however, gives a wrong impression of the problem. An actual test applied to persons loosely described as "unable to read" will show that, in this country, they can nearly all read something, even if such reading is of little or no practical value; and in point of fact, so called illiteracy includes innumerable degrees. Consequently, if numbers are to be estimated with precision, and any practicable schemes put forward for their detection and treatment, it is essential to have more scientific definitions.

[1] A report by W. D. Wall, permission for the publication of which has just been given by the War Office, is included in this number of the *Journal*.

Broadly I would suggest that (i) an *illiterate* may be defined as meaning one who in everyday life is able to make no practical use whatever of reading or writing, and (ii) a *semi-illiterate* as one who is able to make no *effective* use of these activities, that is, one who is debarred by his disability from using the ordinary literary machinery of a civilized country: (e.g., he will not be able to read with any understanding a short paragraph in a newspaper, or to write an intelligible letter home, or to comprehend simple printed instructions). In terms of standardized tests this may be taken to mean that an illiterate adult is one who has an average educational age for reading, spelling and composition of less than 6·0, and a semi-illiterate adult as one who has an average educational age of 6·0 to 8·0.

Since spelling and composition are so closely dependent on reading, reading may be taken as the main criterion, with borderlines of 6·5 and 9·0 years respectively. As judged by the ordinary norms, an illiterate man would then be one who at best could not read more than a few simple monosyllables, and could make no sense of short and simple sentences combining ten or a dozen monosyllables each of which he could read in isolation; he might be able to sign his name, but could not spell more than a few three-letter words, nor write the simplest message consisting of a single phrase. A semi-illiterate man would be one who cannot read more than a few common disyllables, and breaks down over reading such irregular words as "serious" and "belief"; he could understand the meaning of a few short sentences, but could make no sense of a consecutive paragraph of prose; he would be unable to spell words like "yellow" or "sometimes," or write a letter consisting of more than one or two broken and ill-spelt phrases.

Frequency.—Tests carried out on youths and girls of fifteen to twenty-five indicate that, in both categories, the numbers are virtually doubled between those ages. About two or three years after they have left school, it would seem, the two borderlines roughly correspond with what is left of the scholastic attainments of (i) the brightest defectives from the special school, and (ii) the best of the 'dull and backward.' At the age of sixteen, about 1 per cent. of the total age-group fall within the first category and about 10 per cent. within the second. But when we turn to test-results obtained from young men and women five to ten years older, it at once appears that these proportions are by no means final. (At these later ages the number of the illiterate appears to have risen to between 1·5 and 2 per cent., and the number of the semi-illiterate to 15 or 20 per cent.).[1] In rural areas the percentages are higher still; in the city slums they are approximately twice as large. As a rule, the percentages are slightly higher among the males than among women and girls. In round numbers, therefore, we may conclude that in the whole of England and Wales the number of illiterate adults cannot be less than two or three hundred thousand and the number of semi-illiterates cannot be less than three million. In the near future, owing to the irregular schooling received by so many children from raided or evacuated towns, we must be prepared to find that these proportions, so far from diminishing, will rise to higher figures still.

II.—CAUSES AND REMEDIES.

Lines of Attack.—There are three main ways of coping with the problem. First of all, during school years we may seek to instil, not merely lasting habits of reading and writing, but lasting *interests* in those activities, by remodelling our current methods of teaching for those pupils who are below the average level of intelligence and particularly for the dull

[1] The figures cited are based primarily on pre-war studies in London. The groups specially tested were rather small; they cover 135 backward boys and 121 backward girls followed up after leaving school, and 173 men and 54 women tested at clubs, settlements, and the like. More recently, several research workers connected with our department have made further studies of special aspects of the problem, using data collected from Army Selection Centres, from various investigations for the fighting services, and questionnaires on methods of training in the services and on educational problems in the country at large (16). When these and similar surveys have been finally completed and publication becomes permissible, more exact figures for various groups will be available. No doubt, too, in due course the Directorate of Selection of Personnel will be able to issue figures giving test-results and educational categories for the British Army similar to the records published by American Army psychologists after the last war (4, pp. 12-40 and refs.). Here I am only concerned to assess in broadest outline the general nature and size of the problem for the country as a whole.

and backward. Secondly, by continued education during the adolescent years—not so much formal instruction of the classroom type, but education given indirectly through clubs and other youth organizations—we may endeavour to prevent these young people from forgetting what they have learnt at school, and assist them in keeping alive and active the habits of elementary reading and writing acquired during childhood. Hitherto, education for adolescents and adults has commonly connoted instruction in more advanced subjects for the more intelligent and ambitious, who are already interested in, and capable of, a more technical or more liberal type of education; the effort to foster elementary school attainments among the general masses has never been undertaken on any systematic scale. Thirdly, we may institute special schemes and centres where adults who have already lapsed back into partial or complete illiteracy may revive or reacquire the rudiments of reading, spelling, and writing. In this latter direction active experiments have been made in the Army and elsewhere. The success that has attended such efforts in certain quarters shows that they are far from hopeless. At the same time the frequent failures reported by many eager volunteers show that a proper understanding of the complexity of the problem and of the special methods that must be adopted is essential if such schemes are to be of genuine benefit.

The main object of the present article is to call attention to the more important principles that appear to emerge from recent practical efforts in this last direction and from an analysis of the published literature (see references at end).

Causes.—With adults as with children, the first step towards the intelligent treatment of any case of educational backwardness is to inquire into the apparent causes. Here the instructor will be greatly aided by a knowledge of the commoner factors as disclosed by surveys already carried out. It is unnecessary to discuss them in great detail here. For the most part they are similar to those revealed by the study of disabilities in reading and cognate subjects among children of school age. So far as my own inquiries and those of my research-students have gone, the following would seem to be the commoner causes:

1.—*Innate Intelligence.*—In 92 per cent. of my cases, innate intelligence was below normal, in 43 per cent. it fell below an equivalent I.Q. of 85, and in 12 per cent. it was below 70. Where adequate tests have shown that a man's innate ability is almost as low as his educational attainments, then any attempt to raise those attainments may be regarded as all but hopeless.

2.—*Absence from School.*—The most hopeful cases are those in which intelligence is not far below the normal level, and in which the educational backwardness is due primarily to irregular school attendance, particularly to absence during the earlier stages when the elements of reading are commonly taught. In my own studies these amount to 27 per cent. Among these three groups are conspicuous: (i) older men who left school for employment before the age of fourteen; (ii) somewhat younger men who played truant during childhood; (iii) men of all ages who suffered from ill-health or from domestic difficulties that prevented regular attendance throughout the school period.

3.—*Inadequate Teaching.*—Over the country as a whole a large proportion of the illiterate or semi-illiterate appear to consist of typical 'dull and backward' persons coming from districts in rural areas or slum neighbourhoods where no adequate provision has as yet been made for pupils of this type. I estimate that about 25 per cent. of the cases would fall into this category. With the older men, indeed, some effort had often been made to enforce better progress in the classroom, but often by methods so unsympathetic and severe that they had instilled a positive distaste for anything connected with reading or writing.

4.—*Special Disabilities.*—A few cases owe their disability to more specialised defects: e.g., defective vision (14 per cent.), defective hearing (7 per cent.), motor defects such as left-handedness, tremor, stammering, lisping and the like (9 per cent.). A greater number suffer from poor mechanical memory (at least 28 per cent.), and an appreciable number are persons of restricted imagery type, e.g., visualisers taught by phonic methods, or audiles by look-and-say (1 per cent.).

5.—*Emotional Factors.*—Minor emotional disturbances, often reaching a climax during the years of adolescence, play a large part in the educational relapse that overtakes so many young people after they leave school for work. 13 per cent. of my cases were of an unstable, neurotic, or delinquent type. But the large majority (at least 65 per cent.) might be described as healthy extraverts—youths with well-marked concrete and practical interests, averse from anything of a

sedentary, bookish or literary nature. I lay considerable stress on this latter point because it is not only one of the commonest of causes, but one which by tactful methods may most successfully be overcome. During the adolescent stage it appears to develop almost into a protective mechanism, half unconsciously built up, not merely by the individual, but by the group to which he belongs. Those engaged in social activities among the so-called working classes will be familiar with this characteristic. To discuss its origin and nature would lead too far into the psychology of class distinctions.

Since the causes differ so widely, it is clear that an indispensable preliminary to successful treatment is to start with a systematic case-history—a review of all the information available that is likely to throw light on the man's special difficulties or his special needs. The instructor will find his choice of aims and methods greatly assisted if he collects particulars for every youth on a record-form similar to those employed in dealing with pupils in a backward class at school (cf. 2, pp. 630-3). These include the application of standardised intellectual and educational tests, and a study not only of inferior performances and disabilities, but also of special abilities, interests, and occupational knowledge and skill.

III.—PRINCIPLES OF TREATMENT.

The educational psychologist constantly receives requests for advice in regard to the planning of classes, centres, and more informal schemes for dealing with semi-illiterate adults. It may, therefore, be useful if I attempt to set down the more helpful suggestions that may be drawn from the few experiments already made in this somewhat novel field.

(*a*) *Choice of Instructor.*—The most essential step in any scheme for training illiterate adults is the choice of a suitable instructor.

Those who so far seem to produce the best results are young teachers trained in educational psychology, experienced in dealing with backward readers, and familiar with life among youths of the working classes. Secondary school masters and male teachers from ordinary elementary schools are handicapped by the ignorance of the proper techniques for teaching the elements of reading. Visits to a special m.d. school for older boys or an institution for such cases, and to an infant school where up-to-date devices are employed, will be most suggestive. A short training in modern methods of teaching reading, and in the psychological methods of diagnosis and treatment, would be invaluable.

The instructor himself should be of an inventive turn of mind, capable of improvising a wide variety of devices to meet the special needs of his class and of constructing home-made pieces of apparatus. An ability to arouse enthusiasm and inspire confidence, and an inexhaustible fund of patience, are obvious essentials. With male classes a certain degree of breezy energy will be more effective than academic refinement; tolerance and rough humour than criticism or reproach.

(*b*) *An Adult Approach.*—In the main the instruction should resemble, not the routine method of teaching reading to a class of infants, but rather the remedial measures adopted at child guidance clinics where the training of backward readers is systematically undertaken and the procedure is varied according to the cause of the backwardness. The main difference will arise from the fact that the teacher is now dealing with an adult and not with a child. Methods, therefore, which are reminiscent of the schoolroom, and reading books of a babyish nature, may arouse more resentment than interest.

In practice this does not seem to arise so often as might be presumed: I have seen men of twenty to twenty-five, inspired with an eager desire to read, patiently conning over an infants' reader, and spelling out day after day fatuities like "Pat's cat sat on the mat . . . Good boys should make no noise." However, by nature, and still more by habit, the illiterate or semi-illiterate adult is likely to be an active person; sitting still indoors on a form for any length of time is likely to be even more irksome now than it was in his school days. Accordingly, as much practical action as possible should be introduced into the work. Copying and writing letters makes a welcome change from mere reading. Reading exercises and reading games, particularly those which require the man to leave his seat (e.g., executing some little task for which instruction has been given on paper) will be better still. And throughout the instruction given should be linked up, so far as possible, with the practical activities of the man's everyday work at home, in the factory, or in the army.

(*c*) *The Need for an Incentive.*—The first condition of success will be to excite a keen lesire to learn to read and write. In the initial stages the illiterate man will probably be lready convinced that he can never learn to read; and his feelings of shyness and nferiority about his disability will provide a strong motive for avoiding what he fancies will be a new spell of schooling. His earliest tasks should therefore be chosen so as to ead to obvious success, and yield a cumulative interest and encouragement.

At first it may be wise to dissociate the idea of reading from the idea of books. I have eard more than one instructor open his course by pointing out that " unless you first learn to ead all books will remain closed books ": (" Let 'em," muttered one disappointed pupil). ew men of this type will ever care to read even the cheapest novel. To stress the more *practical* ses of reading, especially in connection with the man's personal interests, will be far more ffective. At the outset interest can be excited by starting, not with books, but with advertise- nents, film-announcements, racing news and football results, signs, tickets and announcements een in shops and streets, or official notices and papers, where the advantage of being able to lecipher at least a few words or sentences is immediately obvious.

Owing to the sharp segregation of social classes in this country the trained teacher is too ften wholly ignorant of the day-to-day interests of the working man; and even the philan- hropic worker is likely to be familiar with youths or adults of one particular type only. Much elp can be gained from published studies at adult interests—a topic which hitherto has appealed ore to the American psychologist than the British (12-15).

(*d*) *The Indirect Approach.*—With adults even more than with children, lessons in eading, spelling and writing need not always explicitly appear as such. They should be orked in with informative discussions and exercises dealing with more practical matters nd the everyday interests of the men themselves. The backward reader is generally ackward in general knowledge; and, if the knowledge so imparted bears upon current pics or the man's own immediate future, he will feel his work is well worth while.

(*e*) *Short Lessons.*—Formal exercises or lessons on reading, spelling, and writing as such ould be frequent but brief. While they last the work should be vigorous and intensive. s soon as the class begins to flag, it should be immediately dropped, regardless of any set me-table. Chorus work—e.g., the whole class reading from the blackboard or from their imers—may for a few minutes take its place. (Individual reading aloud in class—a utine at one time popular in the elementary school—should be avoided until the readers ve acquired some confidence in their powers.) But the great majority of the work should done not through formal lessons, but through games or practical tasks, or incidentally the course of sittings devoted to more general modes of education.

(*f*) *Adaptation of Methods.*—It is a common error to suppose that there is some one yal road to reading, suitable to all cases. The notion has, unfortunately, been spread in c past by teachers and educationists who have been enthusiasts for some special device— ten a discovery or invention of their own—which they suppose to be new and which in eir own hands has furnished good results; and the same idea has reappeared in work with lult classes. It seems therefore essential to repeat that there are now many different ethods of teaching reading to the backward, almost all of them efficacious for certain rposes and useless for others. The instructor should therefore be familiar with every ck device; and, so far as possible, select for each pupil those which seem appropriate his particular causal type.

Thus the man with moderately good intelligence will usually make greatest progress with a onic method. The less intelligent, the good visualisers (and the less intelligent are usually onger visualisers than the better educated), and above all those whose auditory discrimination poor, will make swifter progress with what is variously called the ' word-whole ' or ' look-and- y ' method; indeed, experience suggests that this will yield the best results with most youths the type here contemplated. Among the duller a small proportion may happen to possess od mechanical memories; and these will profit most from the old-fashioned, alphabetic or elling method. But, at any rate during the earlier stages, mixed methods should be tried th nearly all.

(*g*) *Individual Tuition.*—An experienced teacher can give individual attention to each of his pupils, even when they are grouped together for class work.

From the outset he will seek to know something of the personality and cultural background of every man at first hand. He will thus be able to choose methods, materials and topics adapted to the needs and dominant interests of each. In an adult class there is no need for everybody to be doing the same as everyone else the whole of the time. If at any stage a lad begins to mark time or lose interest, it will be essential to make a personal study of his special difficulties and to change the methods accordingly.

(*h*) *Reading Books.*—There is an urgent need for one or more printed reading books suitable for illiterate and semi-illiterate adults. The preparation of such books is a matter rather for a small group of competent and experienced teachers than a single author. Three small books, graded in difficulty, printed in appropriate type, and suitably illustrated, are desirable. Together they should aim at imparting a basic reading vocabulary, consisting of the commonest words in use among the less educated classes. The length of the words does not matter. It is a common error to suppose that the difficulty of a word necessarily increases with its length. This is not true with the backward adults, provided the long words are as familiar as the short.

Pending the publication of a set of readers specially suited to adolescents and adults, a common practice is to borrow readers from the local school, especially where the class is held at the school in the evenings. Of those in frequent use, the *Beacon Readers* are perhaps the most suitable. The *New Foundation Readers* (University of London Press) have the advantage of being based on a vocabulary of the commonest words. *Read, Laugh and Learn* (a set of readers published by the Grant Educational Company) seeks to exploit the humorous approach which is so successful with young adults. The *Speedwell Book* (by G. Hume and E. Wheeler) is specially devised for dull and backward children; the *Touchstone Readers* (by Highfield) are designed for backward children of an older age.

(*i*) *Supplementary Materials.*—A reading book and a blackboard are by no means the only apparatus needed. There is now a wide variety of ingenious materials for teaching the elements of reading to backward readers and to infant beginners; and an ingenious instructor will be able to devise or collect innumerable games, puzzles, and entertaining or instructive exercises, to give practice in different directions. Illustrated papers, magazines, cigarette cards, advertisements, posters, and the like, will provide letterpress; and one or two typewriters, a toy printing-outfit, and sets of stencilled letters, will be invaluable.

(*j*) *Special Devices for Special Stages.*—(i) *Letters.*—In the case of backward children, learning the names and sounds of letters is usually postponed until the simpler words have been learnt; but with adults it is generally advisable to impart and practice a knowledge of the alphabet at the very outset. For men who have a special difficulty in mechanically memorizing meaningless symbols, mnemonic devices should be freely exploited. In writing, letters or figures should at first be drawn with separate strokes rather than written. This will lead to print script, which will be superseded by a cursive hand at a later stage. (ii) *Words.*—From the start a clearly defined aim should be the compilation of a useful vocabulary. Every beginner should construct a picture dictionary for himself, e.g., a scrapbook made by pasting pictures and diagrams in a notebook with the openings lettered alphabetically. The vocabulary of 'basic' English is not quite suitable; but some of the lists of common words compiled by educational psychologists will give an indication of the words that are likely to be most useful. The selection, however, should be freely modified to meet the everyday requirements of the group that is being taught.

Phonic methods are helpful for regular words; and analysis and synthesis should be employed in conjunction. The simplest method of phonic analysis is to get the pupils to draw up alphabetical lists of three-letter words in columns and rows, each column containing the same vowel and final consonant ("bad, cad, dad, fad, had," etc.) and each row containing the same initial consonant ("bag, beg, big, bog, bug"). Phonic synthesis will be assisted by a simple reading machine consisting of three movable strips of card, each carrying a column of letters shown one at a time through a slot in the covering card through which the strips are laced; sliding the strips up and down will combine letters in different arrangements giving different

three-letter words. Letters like those used for the game of 'Word-making and Word-taking' may also be used for the same purpose. Later on, similar devices may be employed with consonantal or vowel groups (e.g., " cr-a-ck, bl-a-ck, bl-ea-k, str-ea-k, str-ea-ms," and so on).

Word-whole methods should be introduced almost from the beginning. The men should be taught to recognize short, common irregular words instantly at a single glance, without either spelling or analysis. Innumerable games (flash-cards, snap, etc.) can be devised to speed up this process. But is it as important to associate the meaning with the word as to associate its sound. For this purpose innumerable exercises can be invented requiring the matching of words with pictures; occasionally small objects can be used instead, each concealed, for example, in a club-size matchbox, labelled with the name of the object contained. To a large extent the teaching of spelling and reading should proceed side by side. It is, however, always harder to spell a word than to read it; hence it will be unwise to teach the men to spell those words which they themselves will never employ in writing.

(iii) *Phrases and Sentences.*—As soon as possible the trainees should proceed to reading-matter which expresses complete and intelligible thoughts, e.g., simple commands, comments, or descriptions, beginning with public notices, advertisements, and the like, and consisting of two or more words already known by heart (" way in," " keep out," " do not spit," " smoking strictly prohibited," etc.).

Actions, tools, articles, used by the men at their own daily work, will suggest useful material for this purpose. The devices employed may be partly based on the more popular methods adopted for teaching foreign languages to adults—pictures with short sentences underneath describing the items or the activities; diagrams of ships, aeroplanes, motor-cars, with explanations attached; cards containing words or phrases to be placed in a row to make complete sentences; outlines of stories, letters, or descriptions, roneo'd for the purpose, with spaces in every sentence where the men are to fill in a missing word.

The comic strips that figure in many newspapers, illustrations from *Punch*, a book of Low's cartoons, will provide material. The separate pictures in the strips may be cut off, and the man required to rearrange them in the order needed to tell the story; the titles or legends may be cut off from other pictures, and the man required to place printed matter beneath the right picture. For more consecutive material it will be helpful to choose prose or poetic extracts that the men already know by heart. They may themselves be encouraged to suggest the pieces: (One group proposed the " Lord's Prayer," " Tipperary," " Onward Christian Soldiers," and two Army limericks). Later still the class, especially one which includes both sexes, may be invited to work up a dialogue or a humorous play; each will learn his part from a printed script.

(iv) *Composition.*—From the earliest moment the men should attempt to write notes to each other, or postcards and short letters to their friends. To begin with the class may copy a model letter written on the board by the instructor. Dictation of the schoolroom type should be used but rarely. The pride ensuing when such a letter is acknowledged from home will inspire an eagerness to send more personal communications; and the practical success of requests for money or cigarettes will make letter-writing highly popular. Later on the dialogues and plays which the class performs may be composed and written by the members themselves.

(*k*) *Progress Records.*—Finally, it will be well to keep a record of the progress made, and difficulties encountered, by every individual in the group. A register of marks obtained in fortnightly tests may serve as the basis. With tact, charts exhibiting each individual's progress in graphic form may be used to provide a fruitful incentive; it is better, however, that each man should keep his own chart rather than that the teacher's own records should be pinned up publicly.

Since methods and problems must of necessity differ far more widely among classes for adults than among classes in the ordinary elementary school, such data should provide information of great value to others experimenting in the same direction. The psychology of the adult is still in its infancy; and the scientific study of the more illiterate members of the community provides a most suggestive field of research.

IV.—SUMMARY.

1.—Recent surveys have shown that the amount of illiteracy among adults in this country is unexpectedly large, and provides a pressing problem for the educationist. Taking the borderlines for illiteracy and semi-illiteracy as indicated by reading ages of about six-and-a-half and eight years respectively, it would appear that by the age of about twenty-one 1½ to 2 per cent. of the population of this country are illiterate and 15 to 20 per cent. semi-illiterate.

2.—The commoner causes are the same as those discovered by the investigation of similar disabilities in children of school age. But in addition the redirection of interests on leaving school for work, and the increasing emotional instability of the adolescent, lead to a swift forgetting among the dull and backward of most of the formal attainments acquired at school.

3.—The more obvious remedies are (i) altered methods of instruction during school years, particularly for the dull and backward; (ii) continued elementary education by indirect methods during adolescence, and (iii) the organization of classes for illiterate and semi-illiterate adults.

4.—The training of illiterate or semi-illiterate adults provides novel and urgent problems for the educational, social and military psychologist. Recent experiments have been sufficiently successful for broad practical principles to be provisionally laid down.

V.—REFERENCES.

1. BURT, C. (1914-1932): *Annual Reports of the Psychologist to the London County Council.*
2. ——— (1937): *The Backward Child*; University of London Press.
3. ——— (1943): *The Training of Illiterate Men in the Army* (unpublished memorandum).
4. YOAKUM, C. S., and YERKES, R. M. (1920): *Mental Tests in the American Army*; Sidgwick and Jackson.
5. HUME, G. (1930): *An Investigation into Disability in Reading among London Elementary School Children* (Unpublished thesis); University of London Library.
6. ——— (1935): *Psychology and Learning in the Infants' School*; Longmans.
7. GRAY, W. S. (1922): *Remedial Cases in Reading: Diagnosis and Treatment*; Department of Education, Chicago.
8. GATES, A. I. (1927): *The Improvement of Reading*; Macmillan.
9. ——— (1930): *Interest and Ability in Reading*; Macmillan.
10. MUNROE, M. (1932): *Children who Cannot Read*; Department of Education, Chigaco.
11. SCHONELL, F. J. (1942): *Backwardness in the Basic Subjects*; Oliver and Boyd, esp. chaps. VII-XV and refs.
12. WAPLES, D., and TYLER, R. W. (1931): *What People Want to Read About: A Survey of Problems in Adult Reading*; Chicago University Press.
13. THORNDIKE, E. L. (1935): *Adult Interests*; Macmillan.
14. RUCH, F. L. (1933): "Adult Learning"; *Psych. Bulletin*, XXX, pp. 387-414.
15. SYMONDS, P. M. (1936): "Life Problems and Interests of Adults"; *Teachers' College Record*, XXXVIII, pp. 144-151.
16. BURT, C. (1945): "British Psychology in War-time"; *Educational Forum*, ix, pp. 53-67.

READING BACKWARDNESS AMONG MEN IN THE ARMY.

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Part I.

I.—*Nature and sources of the material.* II.—*Group tests and questionnaire.* III.—*Comprehension levels of the two groups—differences in mechanical and comprehension levels in semi-literate sub-group—comparative figures of illiteracy, semi-literacy and normal ability in the groups studied and in the general population.* IV.—*The part played by intelligence in the causation of reading backwardness—correlations between intelligence and comprehension ability in the adult group compared with those for groups of children under fourteen—comparative educational ratios—wide discrepancy between ability and achievement.* V.—*Other factors associated with backwardness in reading—kind and length of schooling; absence and irregularity of attendance; change of school; attitude towards school.* VI.—*The effects of age and physical condition.* VII.—*Summary and conclusions.*

I.—Introductory—the nature and sources of the material.

The data presented in this paper were obtained in the course of testing a group of 330 men engaged on general labouring duties in a large Central Ordnance Depot. The testing was carried out to determine: (*a*) whether any of the men were fitted for training courses to upgrade them to what in its lowest levels is a semi-skilled trade—that of Storeman; or (*b*), if that were beyond their capacity, whether any could profit by intensive instruction in reading and writing. A group test of intelligence and a group test of reading comprehension were used as a 'screen' to select those suitable for courses and the information so obtained was supplemented by a questionnaire on previous educational history. Men with a reading age below nine years on the group test were called for individual interview.

The first part of this paper is devoted to an examination of the information provided by the group procedures; and the second part to an analysis of the more detailed studies made possible by individual testing.

II.—The group tests and questionnaire.

Two group tests were used:

(*a*) *A test of intelligence.* This consists of a battery of eight familiar types of sub-tests taken from already standardised material, mainly verbal in nature. It was used because circumstances forbade the use of one of the better standardised group tests and because, having been in use for three years in the Army Training Establishment to which the writer is attached, scores on it are easy to interpret in terms of likely examination success. The test and the method of deducing I.Q. and M.A. from it have been fully described elsewhere.[1]

(*b*) *Ballard's Silent Reading Test.*[2] This was set out on three duplicated sheets, the first containing the anecdote, the second the same anecdote as a completion test with sixty-seven blanks, and the third as an answer sheet on which the words to fill the blanks could be written. This method of administration is suggested by Ballard.

[1] This *Journal*, Vol. XIV, Pt. I, February 1944, p. 20 footnote.
[2] *Mental Tests*, 1925, pp. 147-153.

Eaeh man also answered a short questionnaire whieh sought information on his educational history and background. Details of medical category were obtained for 143 of the group.

The 330 men formed the bulk[1] of those employed on general labouring duties in the depot. They were tested in small groups of no more than thirty at a time, and an attempt was made to get away from the army atmosphere as far as possible : the purpose of the testing was explained in simple terms and it was pointed out to eaeh man that he was quite free to leave if he was not prepared to co-operate. Four men in faet did so and their results are not ineluded in the calculation of the figures in this paper, exccpt in the tabulation of details of eduеational history, the information for whieh they willingly supplied.

The questionnaire was given orally and each question explained earefully. The tester walked round assisting thosc who had difficulty in framing their answers or writing for those whose standard of literacy was inadequate to cope with the expression required. All the testing was carried out by the writer and under exceptionally favourable conditions during the early morning or early afternoon, when the men should have been at their freshest.

For purposes of comparison, sixty-six men already trained and classified as Storemen, Class III, were given the Silent Reading Test and answered the questionnaire. Thirty-four of the sixty-six went through the whole procedure including thc intelligence test. Throughout this paper the larger group of 330 will be referred to as the G.D. group and the smaller group of sixty-six as Storemen.

A consideration of the previous civilian occupations of the men forming these two groups suggests that the General Duty (G.D.) group is mainly composed of general labourers, farm labourers, bricklayers' labourers, men who kept small retail shops or who pursued a variety of unskilled jobs in factories. On the other hand, the Storeman group is drawn mainly from skilled and semi-skilled workers, shop and warehouse assistants with a small sprinkling of general labourers and some whose work had been of a semi-clerical nature. It is thus possible to consider the two groups as being fairly representative respectively of unskilled and of semi-skilled labour. The parallel is one which cannot be pressed too far, since both groups are to some extent artificially rendered homogenous through the work of the Personnel Selection Department of the Army and through men passing or failing to pass basic trade tests or examinations during their training. There is therefore, particularly within the G.D. group, less variety in intelligence and probably in literacy than there would be in similar civilian groups chosen at random.

III.—THE READING COMPREHENSION LEVEL OF THE GROUPS.

The average score of the General Duties (G.D.) group[2] on Ballard's test was 9·95 with a σ of 6·26. This is equivalent to a reading age by Ballard's norms of slightly less than ten years, reaching at an upper limit of $+1\ \sigma$ to an R.A. of nearly 12 and at a lower limit of $-1\ \sigma$ to an R.A. below 9.[3] The average score of the Storemen on the same test was 22·76 with a σ of 9·31. This is equivalent to an average R.A. of 14+ with a range of $\pm 1\ \sigma$ falling between R.A. 11 and well beyond the fourteen year level at which Ballard's norms cease. Table I shows for eaeh group the perccntages which fall at the various mental age levels in this test.

These differences in average reading level and in the distribution of reading ability are the most striking features of the two groups. If we accept Professor Burt's borderline of R.A. 10 as the level of semi-literacy,[4] then, whereas only 5 per cent. of the Storemen Group is likely to be semi-literate, 54 per eent. of the G.D. Group is likely to be so or worse.

[1] Thirty-three men, through leave, posting or illness were absent from the testing.

[2] N=323—four men who expressed no interest and three others whose results were falsified by an observable emotional reaction against the test are excluded.

[3] Ballard's norms do not go lower than R.A. of 9.

[4] In his unpublished notes on " The Training of Illiterate Men in the Army."

TABLE I.

PERCENTAGES[1] OF MEN (i) IN THE G.D. GROUP OF 323, AND (ii) IN THE STOREMEN GROUP OF 66 SCORING AT THE VARIOUS AGE LEVELS ON BALLARD'S SILENT READING TEST.

Mental Age.	*G.D. Group*	*Storemen.*
Below R.A. 9	29	0
R.A. 9 and below 10	25	5
R.A. 10 and below 11	20	12
R.A. 11 and below 12	12	12
R.A. 12 and below 13	4	12
R.A. 13 and below 14	6	6
R.A. 14 and above	4	53

By individual testing we can discriminate further and see more exactly how this lowest portion of the group is distributed. The 29 per cent. below a reading age of nine on Ballard's test were personally interviewed and retested with Burt's *Discontinuous Graded* and *Ungraded Reading Tests*[2] and Schonell's *Simple Prose Reading Test*.[3] Table II sets out the information thus obtained in terms of (*a*) Mechanical Reading Ability; (*b*) ability to comprehend what is read; and (*c*) the average of these two aspects of reading skill.

TABLE II.

DISTRIBUTION OF THE READING AGES—MECHANICAL, COMPREHENSION AND AVERAGE—OF 72[4] SEMI- AND ILLITERATE MEN ON BURT'S AND SCHONELL'S TESTS.

Mental Age.	*Mechanical.*	*Comprehension.*	*Average.*[5]
Below R.A. 5	3	13	8
R.A. 5 and below 6	3	13	0
R.A. 6 and below 7	6	28	4
R.A. 7 and below 8	4	26	22
R.A. 8 and below 9	15	21	36
R.A. 9 and below 10	24		25
R.A. 10 and below 11	15		3
R.A. 11 and below 12	14		1
R.A. 12 and below 13	10		
R.A. 13 and below 14	4		
R.A. 14.....	3		

Average Mechanical Reading Age: 9·7 years σ 2·26 years.
Average Comprehension Reading Age: 6·56 years σ 1·32 years.

Burt suggests a borderline of R.A. 7·5 for illiteracy.[6] With this as a standard, the General Duty (G.D.) Group may be divided, according to performance on each test or the average of both, into three portions: (i) those reaching a reasonable standard of literacy; (ii) the semi-literate; and (iii) the illiterate. Table III shows these percentages and comparable ones based upon estimates derived from school populations and actual figures based on unselected intakes of adult men into the army.[7]

[1] Given to nearest whole number only in this and Table II. For more exact details see Part II. of this paper.

[2] *Mental and Scholastic Tests*, pp. 339-41, and 343-5.

[3] *Backwardness in the Basic Subjects*, pp. 521-4.

[4] Ninety-four men in fact fell below R.A. of 9 on Ballard's Silent Reading Test. Of these only seventy-two were available for testing individually. Leave, illness and posting accounted for the twenty-two absentees and there is no reason to think that their omission affected the representativeness of the sample.

[5] The average spoken of was calculated for each man separately by adding together the R.A. mechanical and R.A. comprehension and dividing by two. A similar method was used for Table III.

[6] and [7] Unpublished notes previously cited.

Table III shows clearly that the G.D. group is as a whole one of very poor readers. Among them, accepting the average Reading age as a criterion, there are over five times as many completely illiterate men and over twice as many semi-literate men as might have been expected from the figures found for totally unselected samples.

On the other hand, the low figure of 5 per cent. of the Storeman Group who might be suspected of semi-literacy[1] and the entire absence from it of illiterate men shows that in this respect it is a comparatively favourable sample of adult males. Taken together, the two groups roughly form the upper and lower halves respectively of a normal distribution curve for reading ability in the male population.[2]

Table II brings out another point. Between the average Mechanical R.A. of the G.D. Group and the average R.A. for Comprehension there is a discrepancy of over three mental years. From this it appears that mechanical reading skill is more thoroughly acquired at school than is the application of the habit to the extraction of information from the matter read and that it decays less rapidly after school has been left behind. The causes of this are obscure and will be discussed later.

IV.—THE PART PLAYED BY INTELLIGENCE.

All the G.D. group and part of the Storeman Group were given the test of intelligence already described.[3] The average mental age for intelligence of the G.D. group is 11·73 years, σ 1·5 years, or in terms of I.Q., 78·2 σ 10·2.[4] Thus the group is both markedly lower in general intelligence and more homogenous than would be an entirely unselected sample of the male adult population. By comparison with the G.D. group, the Storemen are markedly superior in ability. It was possible to test for intelligence a sample of thirty-four only of the sixty-six men composing the entire number, but this thirty-four consisted of consecutive intakes and there is no reason to believe them to be other than a normal and representative sample of Storemen.[5] Their average mental age for intelligence on the verbal scale is 13·95 years $\pm \sigma$ 1·68 years or, in terms of I.Q., 93 $\pm \sigma$ 11·2.

[1] Schonell (op. cit., p. 82) cites Hill's figures (*The Education of Backward Children*) of reading backwardness among nearly 3,000 Southend children as being 15 per cent. at age 7+, 13 per cent. at 11+, and 13 per cent. at 14+. The test used was Burt's Graded Reading Test, which is one of *mechanical* reading ability. It is interesting to note that the influence of schooling from 7+ to 14+ was apparently able to effect only a decrease of two per cent. in the gross numbers of the backward—if we can accept the figures for groups at different ages as representative of what is likely to happen to a group in its progress through school.

[2] With, however, some curtailment at the upper end and some piling up of cases of illiteracy at the lower end of the distribution.

[3] The use of a verbal test of intelligence with men likely to be educationally retarded, especially in reading, is open to criticism. It must, however, be remembered that the primary purpose of the testing was to select men for courses of training, success in which is to some considerable degree dependent upon a reasonable degree of literacy. In calculating the average score of the G.D. group on the test, the scores of all those men with a *mechanical* reading age below 9 (as measured by Burt's tests) were omitted. The results of individually testing these men and comparing their scores on the Performance Scale described in Part II of this article do not suggest that they are significantly lower in intelligence than others in the individually tested sub-group with a mechanical R.A. of more than 9. Their omission, therefore, is likely to have had very little effect upon the true average intelligence level of the group.

Miss Mellone cited by Wakelam (this *Journal*, 1944, p. 147) states that a reading age of 9½ is necessary if the results of a verbal intelligence test are to be accepted as a reliable measure. Further, Durell (*American Journal of Educational Psychology*, Vol. XXIV, No. 6, September, 1933) points out that the I.Q.'s derived from group tests which are largely verbal in nature vary significantly with the reading achievement of the individuals (school children) tested. However, the close agreement between the average M.A. derived from the Performance Scale for fifty-one men with a mechanical R.A. of 9 or slightly above and the average M.A. of the same men on the verbal group test used (M.A. Perf. Scale 10·7 years, M.A. Verbal 10·5 years $-\sigma_1$ 1·9 years ; σ_2 1·07 years) suggests that a mechanical R.A. of 9 is not so low as to prevent a reasonably accurate estimate of intelligence with the verbal test used here. The correlation between the Performance and Verbal scales in the closely selected group of men of low intelligence was $+\cdot422-\cdot08$, which, corrected for selection in intelligence by Burt's formula (see footnote [4] to p. 32) is equivalent to $r=+\cdot72$ in an unselected group.

[4] Throughout this paper, M.A. is spoken of in terms of a maximum at 15 years. See footnote to a previous article by the present writer, this *Journal*, 1944, p. 20.

[5] The testing of recent samples shows that the mean M.A. varies between 13.5 and 14·5 years.

TABLE III.

PERCENTAGES OF LITERATE, SEMI-LITERATE AND ILLITERATE MEN IN THE G.D. GROUP COMPARED WITH ESTIMATED AND ACTUAL FIGURES FOR THE ADULT MALE POPULATION.[1]

	(i) *Mechanical Reading.*	(ii) *Comprehension.*	*Average of* (i) and (ii)	(*a*) *Estimated.*	(*b*) *Actual.*
Illiterate— Below R.A. 7·5	4·0	18·5	5·2	1·0	1·0
Semi-illiterate: R.A. 7·5 years and below R.A. 10 years ..	11·7[2]	35·8[3]	47·9	10·0	20·0
Literate— R.A. 10 and above	84·3	45·7	46·9	89·0	79·0

It is possible in each group to arrive at an estimate of the correlation between reading comprehension ability and intelligence. Within the closely selected G.D. group the product-moment r is +·31;[4] in the Storemen group of thirty-four men who completed both intelligence and reading tests, it is +·80.[4] The first of these coefficients is almost certainly depressed by close selection in reading ability within the group and by the fact that it is derived from the lowest proportion of the total distribution of the scores on the intelligence test. It seems likely that the correlation between reading comprehension and intelligence for men in the Army varies about an average between +·31 and +·80—and is probably nearer to that obtained in the Storemen group.[5]

Similar correlations given by Burt[6] and by Schonell[7] range between +·63 and +·86 for children between the ages of eight and fourteen. The figures for this group are of a similar order. It is, therefore, legitimate to conclude that a primary factor in the reading backwardness of the G.D. group is a low standard of intelligence and that this primacy is scarcely less great in these adults, who should have mastered the mechanics of reading, than it is in the child who is still in the stage of imperfect but growing control.

Burt and others have pointed out that an inevitable concomitant of a low level of intelligence is a greater or lesser degree of backwardness. Just under 75 per cent. of the G.D. group are so inherently dull that they must of necessity be backward; but the actual

[1] Since twenty-two men of the ninety-four below R.A. of 9 on Ballard's test were not individually tested, the figures are adjusted proportionately to the sample of seventy-two and then to the total sample of 323.

[2] It is assumed that any man with an R.A. of 9 or more on Ballard's Test will have a mechanical R.A. of at least 10. This percentage therefore is merely the proportionately weighted one derived from the sample of seventy-two out of the total of ninety-four. The figure given is thus an under rather than an over-estimate.

[3] Based in part upon the figures for Ballard's test and in part upon the results of retesting the sample of seventy-two below R.A. of 9 on Ballard's test and proportionately weighting the results.

[4] Corrected for selection in intelligence only, by a formula suggested by Professor Burt. I am indebted to his kindness for suggesting this solution to the present problem, for the formula, for its proof, and for particulars of an ingenious graphical method of solution.

Neither coefficient has been corrected for selection in reading ability, since I have been unable to obtain any estimate of the σ of Ballard's Test in an unselected adult population. The close selection in reading ability in the G.D. Group probably accounts for the lowness of the correlation, for the σ in this group is 6·26 points whereas in the Storeman group of thirty-four it is 10·25 points. Correction of the coefficient obtained in proportion both to the σ of the intelligence test scores of a normal group and to that obtained in the Storeman group for the reading test would give an r of the order of ·5 or slightly higher. The obtained r's in the two groups are: G.D. Group, Intelligence-Comprehension r = +·208; Storemen Group, Intelligence-Comprehension r = +·72.

[5] Biserial and tetrachoric coefficients derived from the dichotomy Storemen—G.D. Group (accepted as higher and lower levels of intelligence) and reading comprehension ability vary between ·73 and ·85. These can only be a rough guide.

[6] *Backward Child*, p. 529.

[7] *Backwardness in the Basic Subjects*, p. 51.

proportion of backward readers is over 80 per cent.—just over 5 per cent. in excess of expectation.[1]

When we turn to the degree of backwardness exhibited by the group, a more striking fact emerges. Burt[2] writes, " in every test of reading, and above all in tests of comprehension, the defective ranks decidedly below his general plane of intelligence . . . His mental age for reading is but litttle over 80 or 85 per cent. of his mental age for intelligence." The group here considered, though not on the average defective, has a mean mental age for comprehension of 84 per cent. of its mean mental age for intelligence.[3] In the lowest group of all for reading and intelligence,[4] the mean comprehension age is barely 63 per cent. of the mean mental age for intelligence.[5] These facts suggest that although intelligence is a pronounced and indeed the most important factor in the production of reading backwardness, there are other influences at work to produce so wide a discrepancy between attainment and ability.

V.—Other factors associated with reading backwardness.

The questionnaire to which allusion has already been made asked for information on points of educational history which might have some association with defective reading ability. The technique of the questionnaire is open to grave criticism as a means of collecting reliable information; but it should be remembered that, in the case of the men answering this questionnaire, all who were not fully prepared to co-operate were asked to say so and little but objective fact was asked for. The principal sources of error would be either misunderstanding of the questions asked or unconscious falsifications of memory. Upon the latter there is, of course, little check in an enquiry such as this. The possibility of misunderstandings was investigated in the case of those men tested and interviewed individually; with them, each answer given to the questionnaire was verified and in few cases—and those only in minor points such as an error of a month or so in stating their age—was it found necessary to vary the original replies.

The information sought by this means was:

(*a*) Kind of Schooling.
(*b*) Length of Schooling.
(*c*) Details of periods of continuous absence.
(*d*) Regularity or otherwise of attendance.
(*e*) Changes of School.
(*f*) Attitude towards School.

Table IV sets out the comparative importance of these factors and the degree of their association with reading backwardness in the two groups. The table is arranged so that in columns a, b, c, and d are printed the percentages in each group or sub-division of a group who show the factor in question. For this purpose the G.D. group is sub-divided

[1] The borderline of mental dulness is taken at I.Q.85. Backwardness is defined by Burt (op. cit. and *Mental and Scholastic Tests*, p. 383) as 85 per cent. of the attainments of a normal child of similar chronological age. In the case of an adult who leaves school at fourteen years of age this is equivalent to a reading comprehension age of 11·9 years. Schonell suggests a borderline of $-1{\cdot}6\ \sigma$ from the norm of a normal group as a line of demarcation for *specific* backwardness requiring special educational attention (op. cit., p .80) but appears to accept an E.Q. of 85 as the borderline for general backwardness (op. cit. p. 60).

[2] *Mental and Scholastic Tests*, p. 383.

[3] It should be remembered that the M.A. of 15 has been taken as the limit of growth in intelligence and that of 14 for Ballard's Reading Test. With both ages at fourteen, the percentages are 87 and 67.

[4] M.A. (Performance Tests) 10·97 years.

[5] Schonell (op. cit., pp. 61-2) points out that " retardation is seen in its most pronounced form in bright children," but quotes Sleight's figures, based on an examination of over 600 backward children, most of whom were dull, of approximately 50 per cent. whose attainments were well below the level of their ability. Durell (in his article previously cited in footnote to p. 31) makes the point that verbal group tests are unsafe measures on which to base achievement ratios. The figure given here for the semi- and illiterate section of the G.D. group is based on a mental age derived from a battery of performance tests and not on that deduced from the group intelligence test. Durell's objection would, therefore, seem to be met in this instance.

into (*a*) those below a reading age of 9 on Ballard's test (ninety-four men)—the "very poor" readers; and (*b*) those above a reading age of 9 on Ballard's test (224[1] men)—the "subnormal readers." In column (*c*) are shown the percentages of the entire G.D. group showing the same factor and in column (*d*) the corresponding percentages for the Storemen Group of "normal readers." These divisions are comparatively rough since a proportion of those grouped as "subnormal readers" have reading test scores equal to the lower part of the Storemen group; but it must be remembered that the storemen have passed a test which in itself implies a considerable degree of literacy as well as of intelligence, and, since any overlap will *obscure* the association of the various factors with backwardness, it is likely to diminish rather than enlarge the coefficients.

In columns e, f, and g are shown the coefficients of colligation (ω)[2], for each factor

TABLE IV.

THE ASSOCIATION WITH READING BACKWARDNESS OF VARIOUS FACTORS IN THE EDUCATIONAL CAREERS OF 94 "VERY POOR," 224 "SUBNORMAL," AND 66 "NORMAL" READERS.

FACTOR.	PERCENTAGES. G.D. Group. (a) Very Poor. Below R.A. 9	(b) Sub-Normal. Above R.A. 9	(c) Total G.D.	Storemen. (d) Normal.	COEFFICIENTS OF COLLIGATION. (e) Cols. a and b	(f) Cols. c and d	(g) Cols. a and d	TETRACHORIC CORRELATION. (h) Cols. c and d	(j) Cols. a and d
KIND OF SCHOOLING:								[3]	
Elementary	72·3	81·8	79·0	70·8	—	—	—		—
Church	21·3	13·3	15·7	10·8	+·14	+·15	+·20	—	—
Special	4·3	1·8	2·5	0·0	—	—	—	—	—
Post Primary	2·1	3·1	2·8	18·5	−·	−·51	−·55	—	—
LENGTH OF SCHOOLING:									
Curtailed	30·1	27·6	28·3	14·1	—	+·22	+·24	+·27	+·26
Extended	9·7	14·9	13·4	26·6	−·12	−·19	−·30	−·30	−·49
ABSENCE:									
3 weeks-6 months	43·6	49·1	47·5	47·0	—	—	—	—	—
Over 6 months	16·0	12·9	13·8	6·1	—	+·27	+·27	—	+·32
ATTENDANCE:									
Irregular	44·7	32·6	36·2	21·2	+·15	+·19	+·28	+·23	+·32
CHANGE OF SCHOOL:									
One change	24·5	25·9	25·2	40·9	—	−·18	−·23	—	—
More than one change	13·8	14·7	14·5	9·1	—	—	+·12	—	—
ATTITUDE TOWARD SCHOOL:									
Positive Liking	42·0	39·2	39·9	50·0	—	−·10	—	—	—
Positive Dislike	26·9	25·3	25·7	16·7	—	+·14	+·17	+·18	—

[1] In the case of twelve men data was scanty or absent in certain questions and they have been omitted in all the calculations for this table.

[2] The nature of the material of this table is such that laborious calculation of either ω or rt would have been pedantic. Hence, Burt's diagram (*Mental and Scholastic Tests*, p. 219) has been used for arriving at ω and the tables given by S. P. Hays (*American Journal of Educational Psychology*, Vol. XXX, No. 5, May, 1939, pp. 391-6) for the calculation of rt and its p.e. No coefficient has been printed unless it was at least $2\frac{1}{2}$ × p.e. which indicates a low level of significance. The p.e.s of the ω's range from ±·07—±·02 and of the rt's from ±11—±·07.

[3] Since kind of schooling cannot be regarded as a continuous variable, the method of tetrachoric correlation is inapplicable.

indicating (i) its importance within the G.D. group as a whole, that is as a factor distinguishing ' very poor ' from weak readers (col. e.) ; (ii) its importance within the entire group of storemen and general duty men, that is as a factor distinguishing a group of relatively poor readers from one which is practically normal (col. f) ; and (iii) its degree of association with semi- and illiteracy as shown by a comparison of the ninety-four "very poor" readers and the sixty-six Storemen (col. g).

Columns h and j show the coefficients of tetrachoric[1] correlation which have been calculated (*a*) for the whole *G.D. group* : *Storeman* dichotomy (col. h.) so that the coefficients may be compared with the product moment r's for reading ability and intelligence (see above) ; and (*b*) for the dichotomy *very poor readers* : *normal readers*—that is for the sub-group of G.D. men below a reading age of nine and the group of Storemen all of whom have a reading age of nine or above on Ballard's test.

The principal general conclusion which can be drawn from this table is that, in comparison with the influence of normal or sub-normal intelligence, the effects of the factors studied here are comparatively slight. Only one coefficient is above ·5 and of the remainder few reach any very marked degree of significance. Nevertheless, since poor reading ability shows a negative correlation with intelligence, the positive coefficients probably indicate a relatively high degree of association between backwardness and the factor in question. They may be generally interpreted as signifying that where innate ability is low the presence of one or more of these handicaps tends further to widen the gap between ability and attainment.

Kind of Schooling.—It will be seen that the majority of all the men studied attended public elementary schools of the ordinary type maintained by the local authority. It is, of course, possible that some of those answering this question about the type of school which they attended may not have known whether theirs was a Church school or not. Each man was, however, instructed, if in any doubt, to write down the name of the school to which he went ; few did so and of those the majority attended Church schools. Only a small percentage of the G.D. group attended special schools and about the same proportion some form of post-primary education (central, junior technical, modern or secondary).

The highest coefficient in Table IV shows a close association between literacy and a post-primary education—an association almost entirely explicable in terms of intelligence rather than in the kind of education received. Not so easily explained is the association, not large but positive, between attendance at a Church school and poor reading ability. It is difficult to decide whether this is due to an actual inferiority in Church schools generally or whether, since Church schools predominate in many country areas, this merely reflects poverty in the material on which the Church schools have to work. Some light is thrown on the problem by a comparison of the scores made on the intelligence test and on the reading test by the men coming from ordinary elementary schools and those from Church schools. Table VI shows these figures.

TABLE V.

COMPARATIVE SCORES ON INTELLIGENCE AND READING TESTS MADE BY (*a*) 50 MEN FROM CHURCH SCHOOLS AND (*b*) 252 MEN FROM ORDINARY ELEMENTARY SCHOOLS, G.D. GROUP.

	Church Schools.	*Ordinary Elementary Schools.*	*Significance of Difference.*
Av. Intelligence Test Score	9·69	11·94	2·28 × σDiff.
Av. Reading Test Score....	7·88	10·12	2·49 × σDiff.

That both the differences are in the same direction indicates that the inferior reading ability of the Church school group is due mainly to a lower standard of intelligence rather

[1] See footnote [1] on previous page.

than to any inferiority in the education provided, though we cannot be sure of this since the low reading age of the majority of the Church school group may have affected their performance on the verbal intelligence test.

Length of Schooling.—Many of the G.D. group seem to have suffered from a curtailment of their schooling. The nature and extent of this is partly concealed by the percentage figures. In the poorest group of all, those below R.A. 9, there were thirteen who began school a year or more late, nine who left school before the age of fourteen (mostly men now over forty) and six whose schooling was curtailed at both ends. In the remainder of the G.D. group (above R.A. 9) thirty-two began school late, twenty-three left before they were fourteen and eight had their schooling curtailed at both ends. Frequently the late start is associated with illness (rickets is mentioned several times) and is as much indicative of a poor physical condition in early life as of parental selfishness or indifference to education. Nonetheless, a late start at school is a serious matter, particularly for the duller child with an unstimulating home environment, since it is in the first year or so at school that the all-important foundations of the mechanics of reading are laid. The child of six or six-and-a-half coming to school for the first time finds that his contemporaries have mastered the alphabet and many of the monosyllabic words. It is then that the groundwork of an emotional rejection of the printed word which seems so hard to him and so easy to the others is laid down. In later years, as an adult, the attitude " I never was much good at reading " persists.

The coefficients which show association between extended schooling and literacy must be interpreted with caution in the light of the percentages of the groups who attended some form of post-primary school. In the Storemen group, the majority of those whose schooling lasted more than nine years stayed on in central, technical or secondary schools. In the group of very poor readers, only one stayed on at school beyond fourteen, one was at a special school, and seven began school at the age of four[1] instead of five. In the remainder of the G.D. group (the sub-normal readers), twenty-seven began at four years old or earlier, and seven remained at school after they reached the age of fourteen, two at special schools, two at central or secondary schools and three at ordinary elementary schools. This is a very similar composition to that of the " very poor " readers, and hence, although we must regard the coefficients in columns f, g, h and j as primarily due to differing levels of intelligence, it is possible that the small ω of $-\cdot12$ indicates a real relationship between an extended period of schooling—especially at the beginning of the school career—and mastery of reading. It is thus complementary in significance to the coefficient for curtailment of schooling.[2]

Absence and Attendance.—At the time of giving the questionnaire, absence was defined as continuous absence from school amounting to more than three weeks. Each man was asked to write down the approximate length of time that he was absent and the reason for the absence. Just under one-half of each group had been absent for a continuous period of more than three weeks but less than six months in the course of his school career, and the cause in the largest number of cases was illness or accident. In a few cases it appears that the absence was due to staying at home to look after a parent. The percentages for very serious absence (over six months) are much higher for the poor readers and show a positive relationship with backwardness in excess of four times the p.e. of the coefficients.

Irregularity of attendance was described as something independent of continuous absence, and was explained as being away more than two or three odd half-days in the course of a term. It shows a positive association and correlation throughout with reading backwardness and suggests that irregular attendance is at least as important as a cause of

[1] Rhodes (*Forum of Education*, Vol. IV, No. 2, June, 1926, p. 113) confirmed the earlier finding of Winch that children who enter school at four are not merely sent there to get them out of the way.

[2] Rhodes (in the investigation already cited) found that *normal* children who enter school at four show to advantage only in " mechanical, manipulative skill with materials," and that later entrants (at 6+) do better in arithmetic and at least as well in tests of general information.

It is possible that the *duller* child (I.Q. 85) whose M.A. at six years of chronological age would be but little more than five would benefit from a much later start at school and a corresponding extension of schooling well beyond the normal age of leaving.

retardation as is lengthy absence. Even within the G.D. group, which as a whole is one of sub-normal readers, the importance of irregularity in attendance stands out; for, while the product moment correlation coefficient between *very serious, serious, and no absence* (treated as a continuous variable) and the raw scores on Ballard's test is insignificant (+·075 ±·04), the biserial coefficient calculated from the dichotomy *Regular; Irregular* and the Ballard raw score is +·22±·05—a degree of correlation which, although not high, does firmly indicate a relationship between the two, even in so closely selected a group. From this two conclusions may be drawn. Common sense supports the statistical evidence that for the pupil of normal or nearly normal intelligence long absence and irregular attendance act as serious handicaps. We may however go further. For a pupil whose innate endowment is subnormal, the habit of casual absence has a more lasting and devastating effect upon his progress in reading. Probably less care is taken by the harassed teacher of a large class to bring the child who has missed an afternoon up to date than is exercised in making good the ground lost through a lengthy period of illness.[1]

Change of School.—Change of school is often alleged as a reason for retardation; consequently each man was asked to write down the number of schools which he had attended, but to exclude from consideration changes—as for example from a junior to a senior school in the same locality—which were normal to his contemporaries. The negative coefficients in columns g and f rather surprisingly suggest that one change of school is advantageous. It is possible to regard this as the effect of the stimulus of a new start somewhere in the middle of the school career and of the sense of achievement which moving on to a different school might bring. But it is likely that the true explanation is much more complex. It is possible that we have here the complementary factor to that discussed in the effect of a Church school education. A child attending a village school, unless he shows himself to be bright enough to win a scholarship, is likely to remain there for his whole school career. On the other hand, the urban child more frequently has the opportunity of passing to a more selective type of school about midway in his career. The small degree of association may, therefore, merely reflect differing levels of intelligence between rural and urban areas, or difference in the stimulus to academic activity which the two environments provide.

This, however, cannot be the explanation of the small but probably significant association between more than one change of school and reading backwardness, which, while it does not differentiate between the subnormal and very poor readers, does do so between the normal and whole subnormal group. Too frequent change of school, with its emotional upset and necessity for readjustment, seems to have effect upon the child of subnormal intelligence which is lasting. The average child apparently has made up any progress so lost before he leaves school.[2]

Liking for School.—Each man was asked to rate his own attitude to school on a five point scale: A was defined as "I thoroughly enjoyed it"; B as "I liked it on the whole more than I disliked it"; C as "I was indifferent, didn't like or dislike it a great deal"; D as "On the whole I disliked it more than I liked it"; and E as "I hated and loathed the place." In the questionnaire this was the only question which could be termed in any large degree subjective and therefore liable to distortion. One of the interesting features is that in all groups a higher percentage rate their attitude towards school as being favourable (A or B) than as being unfavourable (D or E). At the extremes the percentages are not

[1] Schonell (op. cit., pp. 189-91) quotes figures which show that interruption of schooling between the ages of 5+ and 7+ is three times as common among the backward as among normal readers and cites cases in which lengthy absence has had a very marked effect in causing backwardness—especially in the inherently dull child.

But Sandon (this *Journal*, Vol. VIII, 1938, p. 176) points out that "There is in a number of *secondary* school pupils a psychological or physical constitution that results in poor progress being associated with frequent absence, so much so that frequent short spells of absence are related with educational retardation *more* than are less frequent longer spells of much greater total duration," and is inclined to emphasise the factors of psychological attitude and physical fitness rather than the missing of lessons.

[2] In the causation of backwardness in word recognition, Schonell finds irregularity of attendance nearly twice as important as change of school, op. cit. p. 491, Table A.

significantly different—between 12 and 14 per cent. of all the groups giving A and between 7 and 8½ per cent. giving E. In the Storemen group, most of whom must have been reasonably well adjusted to school life, 36 per cent. assess their liking for school as B and only 9 per cent. assess it as D, while in the G.D. group the percentages are 27 per cent. B and 18 per cent. D. Hence the positive coefficients of colligation in columns f and g, though they are small, indicate that backwardness and misadjustment to school life are positively associated.[1] That this attitude does not disappear when school is left far behind is perhaps shown by a small but positive tetrachoric coefficient of $+\cdot185 \pm \cdot056$ between suitability for an army training course as indicated by intelligence and reading ability and the men's own willingness to make the attempt necessary to learn.

VI.—Age and medical category.

A consideration of these two factors has been left to the last since the conditions under which the material of this survey was collected and the nature of the factors themselves make any interpretation of their effect difficult.

In average age and in distribution between the various age groups, the G.D. and Storemen groups are closely similar. The mean age of the G.D. group is 28·9 years with a σ of 9·02 years; that of the Storemen 28·2 years with a σ of 7·09 years. But it is doubtful whether these averages mean a great deal, for in neither group is the age distribution in any sense an approximation to a normal probability curve. In both groups the distribution is truncated at the lower end, below the age of 18 years, with a tendency to a mode between 18 and 19[2] and in both the distribution appears to be multimodal rather than regular. As a consequence of this irregularity it is doubtful whether any valid interpretation can be placed upon correlation coefficients however derived from the data. An attempt was however made, within the G.D. group, to see whether there was any sign of decay in reading ability with advancing age. For this purpose the group was divided into four categories: (i) those over 17 and under 19 who must have had a part at least of their schooling under war-time conditions; (ii) those between 19 and 29 years 11 months, who finished their schooling in the decade just before the present war; (iii) those between 30 and 39 years 11 months, who had their schooling during and just after the last great war; and (iv) those aged over 40 whose education was completed either during or just before the last great war. The average reading scores[3] for each of these groups were calculated but in no case did they differ significantly either among themselves or from the general average of the group. We are, therefore, justified in concluding that as far at least as this group of men is concerned—most of them, be it remembered, relatively poor readers who would be unlikely to make any extensive use of their limited reading skill—there is little evidence to show that their ability in this respect has decayed with the passing of time, or was greatly affected by the general conditions at the time when they received their schooling.[4]

For reasons of security, figures of medical category cannot be published. It can, however, be said that as a whole the group of subnormal readers is of lower medical category than a normal group of Storemen. Further, the proportion of men with officially diagnosed neurotic difficulties is higher than that either in the group of Storemen here considered or than the estimates of declared[5] neurosis and psychosis in the civilian adult population.

[1] See also the end of Section 6 of this paper.

[2] 16·1 per cent of the G.D. group fall between 18 and 18 years 11 months.

[3] The actual figures are (raw scores on Ballard's Test); Gp. i Mean 9.55 σ 5·6; Gp. ii. Mean 9·95, σ 6·85; Gp. iii. 9·10 σ 6·86; Gp. iv. 10·47 σ 4·84.

[4] With a basic skill like reading ability, it seems justifiable to assume that the influences at work on any one age group are comparable to those at work on any other and that, therefore, a group aged between 20 and 30 now will in ten years time exhibit approximately the same degree of similarity to itself or change from itself as is shown now by a group 10 years older.

[5] The estimates of all kinds of neurotic disabilities in the adult population are variable. Halliday (quoted by Valentine, "*The Human Factor in the Army*") found that over one third of 1,000 cases of ill-health were found to be suffering from some psycho-neurosis. It seems to be likely that a great many civilian neurotic cases do not come to the psychologist's attention and that, although some neurotic cases escape the attention of the army psychiatric service for some time after joining, a higher proportion of army men than of civilians are seen by psychiatrists.

The average tetrachoric r[1] between physical fitness and the passing of a trade test for Storemen amounts to +·68 +·02. This coefficient, though high, is not conclusive and is difficult to interpret psychologically. Taken in connection with the evidence offered by this paper, it suggests that the G.D. group is subnormal in all directions, physically, mentally and educationally. Burt[2] concluded that on an average each backward child suffers from at least three adverse factors, intellectual, physical or social, and showed close correlations between backwardness and factors which reflect poor social conditions. It seems likely that some of the present correlation is to be explained in this way—as a complex of physical and environmental factors which have co-operated to widen the gap between ability and achievement in the childhood of these G.D. men.

There is, however, another interpretation possible. Asked whether they wished to come on a course of instruction if considered to be suitable as a result of the preliminary testing, 77·4 per cent. of the G.D. group said "no," alleging as their reason in the majority of cases, "lack of interest." The next most frequent classes of reasons were doubts of their own ability and educational handicaps. The relationship between suitability and willingness to come on a course, though small, is significant. Further, if we calculate the tetrachoric coefficient of correlation between medical category and the dichotomy *Storeman* : *G.D.* on the basis *Neurotic* : *Non-neurotic* it rises significantly ; but if we calculate it from the division *Physically fit* (Category A) : *and Not fit* (below Category A) it falls significantly below the average figure given above. Taken together these facts suggest that orectic factors are closely associated with the reading backwardness of the G.D. group.

The most likely explanation appears therefore to be that physical and environmental factors have combined in early years to produce in these men a mental gesture of avoidance when faced with any form of learning.[3] This is in accord with Schonell's conclusion that "a pupil's initial failure in reading may be due partly to emotional attitudes formed during the pre-school period, and subsequent failure may be influenced considerably by this early failure in what is for the child his first large community."[4] He further states that "the acquired emotional attitudes arising from continued failure were more intense barriers to the pupil's improvement than intrinsic temperamental qualities." In the group of semi- and illiterate men, the wide discrepancy between ability and mechanical reading skill, and between the latter and the power to comprehend what is read, seems to suggest that this emotional attitude persists with an increasing effect after school is left behind. It becomes, too, more general, declaring itself in its milder form in an unwillingness to make the attempt to pass a trade test, and in a more serious degree making itself felt in the high proportion of men in the G.D. group with more or less severe degrees of neurosis.[5]

Thus this brief survey shows a broad agreement with the earlier and more thorough investigations of Burt and Schonell to which it is deeply indebted. To their studies of backwardness it adds the one significant fact that with the passing of time after leaving school, although many of the immediately adverse factors are removed, the backward child tends to develop into the still more backward adult. It emphasises the need for taking special remedial measures with backward readers at the earliest possible moment, and for the realisation that, whereas objectively adverse conditions are of importance, the emotional approach of the child to the problem of learning to read is of the utmost importance, since it is liable to become a persistent and all pervading part of his adult life pattern.

[1] Based upon divisions at Categories A, B, and C.
[2] *Backward Child*, p. 97, et. seq. and concluding chapter. Schonell also lays emphasis on the plurality of causes. Op. cit. pp. 202-3.
[3] See footnote[1] to this article, p. 37.
[4] Op. Cit. p. 200 ; p. 494.
[5] See Part II of this paper.

VII.—Summary and conclusions.

1.—A group of 330 men engaged on general labouring duties (the G.D. group) in a large Central Ordnance Depot were given a test of intelligence, a reading test, and answered a questionnaire on their educational history. These men are largely representative of the labouring and lower unskilled classes of the community at large. A comparative group of sixty-six men engaged in the semi-skilled army trade of Storeman underwent all or part of the same procedure. This latter group may be taken as representative of semi-skilled trades and small shopkeepers generally.

2.—Between the two groups, marked differences were found in (*a*) the average level of reading ability; (*b*) the proportions of literate, semi-literate and illiterate men. It is inferred that proportions of semi- and illiterate men in the G.D. group are markedly higher than in the population at large.

3.—Individual testing of those of the G.D. group who fell below a reading age of 9 on Ballard's Reading Test, revealed a discrepancy of three mental years between average mechanical reading age and average comprehension age.

4.—The low reading ability of the G.D. group can partly be explained in terms of a low level of general intelligence; but there is a wide discrepancy between ability and achievement, especially in the group of weakest readers whose comprehension level is barely 63 per cent. of what it should be judged by their level of intelligence.

5.—The following factors in the previous educational history were found to be associated with backwardness in reading: Curtailed schooling, particularly a late start; serious and prolonged absence; irregularity of attendance; and more than one change of school.

6.—There is evidence of an association between backwardness in reading and a low physical and emotional tone. It appears that this tends to persist in the adult from childhood and may result in rejection of any means of advancement which depends upon formal training.

7.—In the main this study confirms the conclusions of earlier investigators into backwardness in school children, adding the further fact that, although some of the environmental handicaps may diminish or disappear as children become adult, the emotional ones persist and the gap between ability and achievement becomes wider.

I should like to express my indebtedness and gratitude to Professor Burt and Professor Valentine for their helpful criticisms and suggestions throughout the enquiry. To the Commandant and others at the Depot concerned, to the Officer in Charge of the Training Wing and to colleagues on the staff who have helped with discussion, and at times with the preliminary analysis of the data, my thanks are also due.

AN EXPERIMENTAL FARMING CAMP SCHOOL.

By W. S. FLACK.

I.—*The idea and outline of the plan.* II.—*Must education be restricted to lessons in school?* III.—*Limitations of normal city environment.* IV.—*Immediate requirements of the adolescent.* V.—*Social adjustments.* VI.—*Influence of the group.* VII.—*Co-education.* VIII.—*The educational values of farm work.* IX.—*Understanding between town and country.* X.—X.—*Knowledge of individual pupils.* XI.—*Attitude of parents.* XII.—*Reactions and reports of pupils.* XIII.—*Improvements suggested by pupils.* XIV.—*An essay on the camp school by a senior pupil.* XV.—*Conclusions.* XVI.—*Summary.*

I.—The idea and outline of the plan.

This article deals with the psychological aspects of an experiment which was carried out during the summer term of 1944 by the Aston Junior Commercial School, Birmingham. During the two previous summers we had organised very successful holiday harvest camps. Although over 100 boys and girls attended each camp we could not accommodate all those who wished to go and daily contact with pupils at the Camp gave abundant evidence that war-time necessity had brought into being a new venture which, besides being useful to farmers, had great educational possibilities. For city children there is no doubt that experiences gained in farm work have much educational value, but a whole day's work tends to become rather strenuous and monotonous. The best type of education is a combination of thinking and doing and at a holiday camp there is a tendency towards too much doing and not enough thinking. If part of the day could be set apart for well-planned lessons centred round the country-side and the remainder of the day devoted to varied work on the farms, then we should be giving these city children both ideas and experience relating to an environment of which they have been deprived by an excessive industrial development around their homes. We have now had an opportunity of putting such a procedure into practice.

In consultation with Mr. C. A. Richards, the Labour Officer to the Warwickshre War Agricultural Executive Committee, provisional plans for a Farming Camp School were drawn up in September, 1943. These plans were approved by the Birmingham Education Authority and the Camp School was held at Broom, a small village near Bidford-on-Avon, in Warwickshire. Two groups of boys and girls, each containing sixty-three pupils whose ages ranged from fourteen to seventeen years, attended the Camp each for four weeks, between June 3rd and July 29th, 1944. School work took place on six mornings of each week from 8-30 to 11-45 and the pupils were engaged on agricultural work from 1-30 to 5-30 on five afternoons of each week. The school work took place in three class-rooms contained in permanently constructed buildings on the camp site. The Agricultural Committee was responsible for the catering and staffing of the domestic side, and pupils were not required to carry out kitchen duties. The money earned by the pupils on farm work was spent on the provision of necessary food. The Second Master of the school was in charge of the Camp and he was assisted by three mistresses. These members stayed at the Camp for the whole eight weeks. The above details will give a general outline of the plan adopted. Lack of space forbids my dealing with such matters as the financial side, rearrangements at the home school, etc.

II.—Must education be restricted to lessons in school?

Of course, it is to be expected that a new venture of this kind will receive opposition as well as approval. For instance, I have been asked the question: If this half-time system of work and school is beneficial to pupils, why was the half-time system in the early days of compulsory schooling abolished? Again I have been asked: Why are the children on the spot, the village children, not drawn into the system, for it must not be assumed that

village children are healthier than town children? A third question asked is this: Can farming be considered a subject suitable for part of the curriculum of a Junior Commercial School? Criticism of this kind must be welcomed and carefully examined in the case of any progressive development. In fact, although the experiment has been generally approved by both staff and parents, a most valuable general effect has been the discussion which has been aroused as to educational aims and values. Our problems have been examined more widely and from various points of view.

In trying to justify the Farming Camp School may I at the outset make one point quite clear. As a Head Master it is not my duty to sacrifice in any way the education of children in order to supply labour to farmers, however necessary it may be. My sole criterion must be the value of the Camp School to the children themselves. Some thoughtless people may assert that a certain amount of help to farmers in term-time is bound to be accompanied by a loss to the children's education. This is sometimes true but not always true. When village schools are closed in term-time so that the children can assist farmers, it is probable that the children are losing educationally. If city schools were closed in term-time so that the children could help in factories, there would be quite rightly a loud protest from any head master. However, this does not mean that children living normally in a large city must therefore be losing educationally if they spend a strictly limited period of their school life helping farmers in healthy and beautiful surroundings which are strange and unfamiliar to them. It therefore follows that in considering educational values we must give consideration to the normal environment of the children concerned.

III.—Limitations of normal city environment.

It has long been recognised that environment has a great influence upon physical development, but perhaps adequate consideration has not been given to its influence on mental interests and emotional development. Having been brought up myself in real country miles away from a town and having been concerned with the education of children in a large city for the greater part of my teaching service, I contend that the city child loses a great deal owing to his unnatural environment. Should an opportunity arise, by which we can counteract the limitation of the city environment, then we must take advantage of it.

At the present time I happen to be the Head Master of a school containing 460 boys and girls between the ages of thirteen and seventeen years. The school is situated near the centre of a huge city extending miles in all directions and having built-up areas outside its boundaries on some sides. The restriction of transport in war-time has shown the difficulty of getting into open country even on a bicycle. The normal environment of most of the pupils has very little contact with nature—no fields and hedge-rows, a scarcity of growing crops, a few unhealthy looking trees and practically no animals. Industrial development has transformed a beautiful and natural environment into one which is artificial and ugly.

Psychological investigation has shown that during the early stages of adolescence there is likely to be aroused a new delight in Nature, landscapes begin to mean more, the beauty of natural objects makes a greater appeal, flights into new realms of experience are welcomed and so on. If this be the case then it may be asked whether the normal school life in a big city is really satisfying the educational requirements of the young adolescent in the broadest sense. Most of my pupils hurry to school in buses, spend most of the day sitting in desks with occasional periods at the playing-fields, at the swimming bath or in the gym., and then hurry home again to spend an hour on homework. The popularity of the cinema indicates the absence of healthy, creative, worth-while activities during leisure hours. When they leave school the majority of the pupils will be employed in city offices and their holidays will be cut down. This new life will be even more confined and restricted. The solitude and beauty of the country will probably have no attraction for them and during the holidays they will be tempted to go in crowded trains to large sea-side resorts, where there are further built-up areas and the usual town amusements. Are we to blame them, or are we to blame the limitations of their educational environment? This way of life is

the one that is likely to appeal to them because they have experienced no other. A person can only see his own way of life in clear perspective when he has seen and experienced other ways of life. Country life will mean nothing to him if viewed from far-off and his own unnatural way of life in drab surroundings will seem quite natural because he has experienced no other.

IV.—IMMEDIATE REQUIREMENTS OF THE ADOLESCENT.

Much emphasis these days seems to be placed on the desirability of dividing the educational process into separate stages—primary and secondary. This division has disadvantages as well as advantages, so if we neglect the latter then we shall have gained little or nothing. It is being more and more realised that the primary stage should not be looked upon mainly as a preparation for the secondary stage, nor the secondary stage as a preparation for maturity. The education provided in each stage must make provision for the child's *immediate* requirements—physical, intellectual, social and moral. Until we have considered carefully what are the particular requirements of each stage we are not in a position to plan for progressive developments. Furthermore, we can't state the requirements of each stage until we have considered the psychological characteristics of the pupils at each stage. The wrong type of work done well may be no better than the right type of work done badly. We must note carefully the warning of Sir Richard Livingstone: "We drift into and through education in a mechanical, automatic, unthinking way instead of clearly defining in our own minds what we wish education to do for us, and asking whether it is doing it, and if not why not? Like religion, education quickly degenerates into a routine—then its meaning and its effects are lost." If we associate education only with books and reading, with classrooms and desks, with subjects and examinations, and lose sight of the natural growth and development of the child with its consequent requirements, then we shall continue to fit the child into the traditional system of education and fail to pay due regard to the real needs of the child. It follows that in assessing the educational value of the Farming Camp School we must constantly keep in mind the particular psychological requirements of pupils between fourteen and seventeen years of age and ask ourselves whether these requirements are being fully satisfied by the normal school environment.

Let us, therefore, consider in relation to the Farming Camp School some of the psychological characteristics of adolescence. It is generally recognised that the glandular changes associated with sexual maturity intensify the primary emotions, though perhaps not to an equal degree. As feeling is the source of action, these intensified emotions naturally lead to a desire for greater activity both mentally and physically. Adolescence provides both an opportunity and a danger, for the intellectual and emotional aspects of mental life cannot be separated, especially when the emotions have been temporarily reinforced. If neglected, these intensified emotions may be fastened on to unwholesome activities which happen to be close at hand. It is the duty of education to group and link up these intensified emotions with new and desirable aspects of life and with wholesome activities. If they are carefully guided and nurtured now, worthy leisure interests may be kindled. If we wish education to be continued with enthusiasm after full-time schooling has finished, then we must not put our faith in the incentive of examination successes but in our success in building up sentiments of attraction for worthy activities, hoping that the associated groups of emotions will provide an enduring urge towards greater and greater achievement. During adolescence the instinct of curiosity is supposed to be particularly active. It tends to create attraction for the strange and unfamiliar, a keenness to take part in new activities and a desire to move in a wider environment. As a safeguard against unwholesome interests the adolescent must be kept busy and given plenty to do. This does not necessarily mean more book learning and homework. The majority of adolescents find their greatest joy not in purely intellectual pursuits but in outdoor activities and in more practical occupations. The growing mind and the growing body must be exercised together. Viewed from this psychological point of view could anything be more suitable for a city boy or girl than a month of Farm plus School in the country? During the mornings he gains some knowledge, some understanding

and some appreciation of the country side. He is actually studying the country *in* the country, for all the lessons have a country flavour about them—literature, local history and geography, nature study, discussions on farming, the village, the weather, country life, farmers' accounts and so on. After a morning spent on such work in the classroom he naturally looks forward to an afternoon in the fields. His school work encourages him to observe more widely and more carefully and to relate his ideas of the morning with his experiences of the afternoon. Without the part-time farm work I feel sure that the Camp School would lose much. It enables the children to take a share in country life and to get off the main roads into the fields and orchards. They learn the hardships and difficulties of country life as well as its compensations. The children feel that they are actually living in the country as useful citizens and not staying there merely as visitors.

At the Farming Camp School a curriculum based upon activity and experience becomes a reality in the hands of a team of energetic and enthusiastic leaders. The school work was 'country-side centred.' Members of staff used the country-side as a starting point and related their own particular subjects to it. This is not possible to the same degree with all subjects. For example, the possibilities of relating English, History, Geography and Nature Study are enormous, but for the time being subjects like French become of minor importance. Instead of the normal school Mathematics, time was spent in examining up-to-date statistics to bring out many of the salient features of country-side problems. Shorthand and Typewriting became most valuable when compiling records of work and summaries of notes. The examination of farmers' accounts brought new interesting material to Book-keeping lessons and helped to give some first-hand knowledge of the farmers' complicated tasks. An excursion was made to Stratford and the Dramatic Section produced scenes from Shakespeare for the entertainment of their parents on Sundays. This was done in the open-air and in consequence many willing hands were needed to produce the necessary stage, scenery, costumes, etc. During recent years many interesting books giving an insight into rural matters have been published and the good selection in the Camp Library proved very popular. The discussions in the evenings led by local residents varied. Any attempt at the formal lecture following the study of books had little appeal. The children wanted the local residents to be perfectly natural and talk rather than lecture, and they themselves also wanted to talk and discuss. They were often fascinated by the personality and general manner of the speaker and the more he seemed to 'tune in' with the local environment the greater was his appeal. The basis of a successful Farming Camp School is co-operation and for this to exist there must be opportunities for its expression. Not only must the campers go to the farms but the local residents must come to the camp. In this way the ideal relationship is developed.

V.—Social Adjustments.

During adolescence there seems to be a rapid development of the social impulses or instincts leading to a hunger for companionship, for friendship, and for co-operative effort. The self is being socialised. Self-centred childhood is being adjusted to meet the needs of membership of a community. With this in mind let us consider the limitations of the home environment and the possibilities of the Farming Camp School.

As there are only two Junior Commercial Schools in Birmingham, many of the children have to travel a very long distance to and from school. This curtails the amount of time that they are able to spend at school. In consequence there are insufficient opportunities for them to work and play together under less formal conditions than exist in the form-room. The school therefore tends to become too much an instructional centre instead of an educational centre in the widest sense. The Camp in some degree tends to counteract this tendency by providing for the pupils a young people's community which is active, congenial and purposive, at a most important stage in their development of character.

The Hadow Report of 1926, dealing with the education of the adolescent, particularly emphasises the duty of the school in the "forming and strengthening of character." But how is this to be done? Is it a matter of instruction or training or both? Can it be done

in the form-room or is it mainly a matter concerned with less formal activities? We hear a great deal about the importance of the Prefect System in forming character, but about 95 per cent. of the children in a large school never become prefects. Then again, prefects are usually selected from those who have already developed relatively strong characters and powers of leadership. Those who particularly require the forming and strengthening of character will certainly gain very little from the Prefect System. I think it is true to say that, generally speaking, secondary education has never yet really faced up to this problem of character building. It is looked upon as a side issue in comparison with the importance of success in written examinations. It is quite possible for a boy to possess an excellent leaving certificate and yet be entirely self-centred, having little thought for others and not much skill in the art of living. He has retained much of the egoism of childhood mainly because an excessive concentration on book learning both at school and at home has restricted the development which might have arisen from active membership of a community founded on a spirit of service and fellowship.

It is now being more and more realised, I think, that during adolescence the two innate tendencies, self-assertion and self-submission, are strongly reinforced owing to the greater social tendency, and that the development of character is largely a matter of getting the right balance (within the self regarding sentiment) between the two emotions associated with these instincts. The over self-assertive child has too much pride and not enough humility and, on the other hand, the too submissive child has too much humility and not enough pride or belief in self. It is difficult to get the right balance solely in the form-room, for, although there the too self-assertive child can easily be put in his place, he may make up for this out of school when uncontrolled. Then again, the too submissive child has little chance of gaining more confidence, for he is usually overlooked when the usual form-room jobs are allotted. The "subjective" or "introvert" types undoubtedly gain a great deal at the Camp School, where there is far greater opportunity for service within the group. They soon lose their feeling of isolation, forget their fears and find themselves taking a normal part in the general life of the Camp. While at the Camp and after returning one often hears the remark, "The Camp has brought him out." This adjustment is certainly the concern of the educator and the Camp School seems to provide a splendid opportunity for work in this direction.

VI.—INFLUENCE OF THE GROUP.

Besides strength of character we have to consider quality of character. Moral conduct which is essentially social conduct cannot be taught; it must gradually be moulded by the give and take demanded by membership of a society which has high ideals of service and fellowship. Here again the limitations of the form-room are compensated by the possibilities of the Camp School. The boys and girls live together for a month away from their parents. Teachers have a far less dominating influence, and external control is more in the background. School is transformed into a society instead of a place of instruction. The approval and disapproval of one's fellows is easily aroused and is freely expressed. Friendship becomes more of a reality and is more valued. The influence of the group is developing self-control and self-discipline. Standards of conduct regarding the self are being established. Unseen powers and shortcomings in others are noted and previous opinions are revised. There are plenty of opportunities to spot the slackers, for dodging on the part of one usually means more work for others. Perhaps a lorry, which has to be unloaded, arrives in the Camp outside working hours. Some boys are on the job straight away, others have to be asked, while others may try to remain out of sight. At school slackness by one pupil is not resented by other pupils but at the Camp it is quite different, for work is usually a co-operative effort. Boys do not mind doing extra work when there is a legitimate reason for it, but they resent doing the work of a boy who won't do his share. At school a small amount of work may be due either to lack of understanding or lack of effort, but at the Camp School lack of understanding is no excuse for little work. Here conduct is mainly controlled not by the approval or disapproval of the teacher but by that of fellow workers.

VII.—Co-education.

A Farming Camp School which is co-educational has great advantages. In a school containing pupils drawn from a very wide area it is difficult to arrange sufficient out-of-school activities to enable the boys and girls to mix freely and naturally in a friendly and healthy atmosphere. In the form-room, attention must be devoted to the lessons concerned and at intervals the pupils are in playgrounds which are entirely separate. It is quite possible for a school to contain both boys and girls and yet do practically nothing in the direction of co-education. If education has a part to play in developing the right relationship between men and women then we must not lose opportunities during adolescence. To-day we hear a great deal about the necessity for sex-education, but scientific knowledge is not the main requirement for moral conduct. The right relationship between boys and girls is not a matter of instruction and is certainly more concerned with co-education than with sex-education. It has to grow naturally by day to day contact in an environment giving ample opportunities for boys and girls to work together, play together, converse together and co-operate in doing something worth while.

The aim at our Farming Camp School is to mould about sixty boys and girls into a society much more interdependent than that at the Home School—a society which is inspired by new studies, purposive work, an unfamiliar and interesting environment, a friendly sympathetic atmosphere, and numerous opportunities for co-operative effort. If the boys and girls were thrown together with little to occupy their minds we should naturally expect problems to arise, but at the Camp School we find that boy and girl problems are particularly rare. Of course, we get the odd boy who for a time is 'girl-mad' and the odd girl who is 'boy-mad.' This is to be expected, and a quiet, friendly, confidential word produces the necessary adjustment. If such boys and girls have no opportunities of meeting in a controlled environment they will certainly find opportunities of meeting in an uncontrolled environment, and then no steps can be taken to build up self-control and self-respect. Our general policy has been to make as few rules as possible having in mind the dangers of sex-problems, to treat the pupils as young men and young women and not as children, to trust the pupils and not to adopt a suspicious attitude and be constantly on the lookout for wrong doing, and finally to deal with individual cases should any action have to be taken. We have found that our faith and trust have been appreciated by the children themselves and that a less obvious external control has meant more self-control.

VIII.—The educational value of farm work

At a Farming Camp School everyone must realise that efficient work on the farms is just as necessary as efficient work in the classrooms. The privilege of living in the country for a month is associated with a responsibility. Quite naturally some children are quite willing to accept the privilege and pay little regard to the responsibility. If this spirit be allowed to prevail then dissatisfaction and lack of confidence in the minds of farmers are bound to spring up.

Experience gained at our Holiday Harvest Camps in previous years has been most useful in the organisation and supervision of farm work. Control on the farms is just as essential as in the classrooms, and the only people who can exercise that control are teachers. Of course, the methods adopted in the fields are different from those in school, but in the absence of supervision, sooner or later at least a few boys and girls are likely to neglect their responsibility and then slackness is bound to spread. The ideal, of course, is hard work without supervision, but this will never be achieved by sending children to work on farms with no check on the results. Once we are assured that a group of children fully realise their responsibilities then supervision can be relaxed though not entirely discarded.

The establishing of a calm, friendly, happy relationship between staff and pupils is the foundation of successful farm work. The boys and girls are quick to resent being treated as children. Encouragement and words of appreciation when deserved are far more effective than constant criticism which only causes irritation. A pupil who is working really hard likes to receive some recognition and a pupil who is slacking is anxious to hide

the fact. Experience shows that control becomes comparatively easy when it is possible for the teacher to keep an accurate record of the actual work carried out by each pupil. There must be an awareness of 'accountability' in the mind of the worker together with an expectation of approval or disapproval. Only in this way can a sense of responsibility be inculcated. The old saying of the boy—"Praise me if you can, blame me if you must, but don't ignore me," is just as applicable on the farm as in the classroom. If we send children to work on farms and ignore their efforts there can be no certainty that the work has much educational value.

Of course, it is a mistake to set children an unreasonable task, expect it to be done and then blame them for not doing it. This sometimes happens at the holiday camp when the children spend the full day on the farms. A seven hour day on agricultural work is certainly too much for many children unaccustomed to it, especially on a holiday. Rest pauses have to be given at regular intervals but even then the morning's work is far more efficient than that of the afternoon. We find it advisable not to prolong the work once the majority of the children are really tired. At the Camp School the daily farming work only extends for four hours. This is a great advantage—it is reasonable and the staff expect efficient work throughout the period.

We find that children are very interested in the financial results of their labours. They were told at the outset that they would be expected to earn 15s. per head per week to pay the expenses of food and catering. They were regularly informed how near they were to their target and there was a general desire to carry out the undertaking. In the end the children succeeded in earning an average of 14s. 10½d. per head per week for the whole eight weeks. Considering the time lost by exceptionally bad weather this was an excellent result.

The War Agricultural Executive Committee arranged the transport of pupils to and from Camp and consequently the farms visited cover a wide area. An effort is made to vary the type of work from day to day as much as possible in order to widen the experiences of the children and to avoid monotony. The Camp site is situated in an agricultural area noted for its fruit-growing and large scale market gardening. This type of farming provides a good deal of seasonal labour which is not too strenuous for older children. Without a guarantee of this extra labour a good many crops would not be sown or planted and the nation's food supply would undoubtedly suffer. The remarks about our Camp of the Chairman of the Local 'Growers' Association in a broadcast speech may be quoted here: "I agree that the children do far better work in two four-hour days than in one eight-hour day. There's one thing I would like to emphasisc. This is a dependable organisation and the children are disciplined. This is the sort of Camp we *do* want. It's very different from what we used to get, when crowds of holiday-makers came down and camped on the field and did far more damage than work. We were scared stiff when they came into the district. Many of the growers would not have got this stuff in without the help of these boys and girls. They have set free our regular workers to do the more skilled jobs. If we get camps like this town boys and girls will be welcome in the country. I'm sure that every grower will give his support to the scheme."

The fact that the work being done is so valuable has a great effect on the attitude of the children towards it. They realise the solid purpose behind it and that they are contributing something in this time of urgency. They don't mind tiring themselves when they see the necessity of effort. The shirking of a boy is the concern of other people besides himself. A job which is really necessary must bring some feeling of satisfaction when it is completed. Professor Valentine[1] states: "So far as service is appealed for among our young people, it should surely be based on the ground that their help is needed and useful, and not that it is 'good for them.' Indeed, it is only service given on such a basis that is, in fact, likely to be 'good for their souls,' for it is that which will appeal to them most." The fact that agriculturists are at present more keen than educationists on the Farming Camp School idea indicates clearly that the work is needed and useful. This in itself adds to the educational value of the work.

[1] See "Adolescence and some Problems of Youth Training," this *Journal*, Vol. XIII, Part II.

IX.—Understanding between town and country.

The children may return from the farms tired but after a clean up and a good meal they are soon full of energy again. It is a kind of healthy physical tiredness and not the kind that follows sustained monotonous work on which the whole attention has to be concentrated. The children are usually working in groups and are able to discuss all sorts of subjects among themselves or with members of staff who happen to be present. Their keenness to get answers to the 500 questions in the 'quiz' given them (about farm work and the country) tended to establish a friendliness with local farmers and workers. The wide variety of problems created a desire for information on all sorts of problems on all sorts of farms. Without doubt the 'quiz' proved an excellent device to set the children talking with the people whom they were helping. Much is being said and written these days to emphasise the importance of greater understanding between town and country. This will not be achieved in great degree by lectures, exhibitions, etc. If, however, we can get town and country people working together, helping one another and exchanging points of view, then we shall get real understanding and greater unity. This is exactly what the Farming Camp School did.

X.—Knowledge of individual pupils.

It is interesting to compare one's opinions of individual children formed at the Home School with those formed at the Camp School. In the form-room it is natural that there should be a tendency to over-rate the all-round worth of a pupil who is good at the normal school work. Generally speaking, such a pupil turns out to be well-behaved and a good worker at the Camp but one finds that high ability in school work is no sure indication of leadership, versatility, initiative and resource in general camp life. In the form-room one often sees the boy who seems to a have a good deal of surface cuteness, who continually promises well, but who in the long run seems to achieve little of real worth. His books are untidy, and there is little sign of steadfastness of purpose, continuity of effort or consistency of action. He may start off willing to make a sustained effort, but he is unable to do so owing to a lack of driving force. His emotional background seems to lack organisation. It is rare for such a boy to be an outstanding success at the Camp. Usually the weakness which is evident at the Home School is just as evident in Camp life. He may start on a job at break-neck speed and work really hard for a time but his lack of staying-power is soon obvious. The absence of long-term persistence seems to be a kind of general factor in his character both in school and out of school.

In between these two types of pupil—those who excel in school work and those who are constantly restless and inconsistent—is a third type. I mean those boys who do fairly well at school, who are rarely conspicuous in the form-room and who may pass through the daily routine of school life without appearing prominent or outstanding in any particular direction. Some (not all) of these boys return from the Camp with very different reputations in the minds of other pupils and particularly in the minds of the staff. Camp life has given them an opportunity to show their powers of leadership, their loyalty, initiative and resource. It seems that the Camp enables us to see these boys from a much wider angle which brings to light their real worth. This applies to girls quite as much as boys. Knowledge regarding the doings of the pupils either at the holiday harvest camp or at the Camp School has been of the greatest value in selecting school prefects. I think it is true to say that some of our best leaders would not have been identified by members of the staff had not camp life and farm work given these boys and girls an opportunity of exercising their outstanding character qualities. Good prefects can have a desirable influence throughout the school as a whole, so, in an indirect way, a school camp is helping to increase this beneficial influence.

XI.—Attitude of Parents.

There were adequate opportunities for the parents to visit the Camp School on Sundays and most parents took advantage of them. There were many expressions of appreciation and none of regret, although the weather could not have been worse at times.

Not one request for an early return to Birmingham was received, although owing to the bad weather such requests would have caused no surprise. The expression, "I wish such a Camp School could have been organised in my young days," was heard over and over again. The following remark made by the head girl is interesting and probably represents the views of others: "Before I came here my parents were anxious about the school work that I might lose. They came down to see me last week and they realise now what I have got out of it."

XII.—REACTIONS AND REPORTS OF PUPILS.

Probably the best criterion regarding the educational value of the Farming Camp School is found in the minds of the boys and girls who attended. The children were therefore asked some time after returning to Birmingham to write essays containing their candid views regarding the Camp School. The desirability of frankness and sincerity was emphasised and also the need for criticism as well as appreciation. After reading through these essays one gets a very clear picture regarding the reactions of the pupils. Interesting comments concerned with various aspects of camp life have been grouped together and are given below:

A.—*General.*

(*a*) "I spent my healthiest and happiest month of 1944 at Broom, and if ever I have the chance of going to a Farming Camp again I shall certainly go."

(*b*) "I had never lived under canvas in my life and I enjoyed the new life very much. Neither had I worked on the land. At the camp we benefited far more than by staying at Aston, both in education and health."

(*c*) "My general impression of the camp is—how time flies! I don't think I have known it to go so quickly."

(*d*) "If I had the chance to go again I certainly would go even if I had to weed onions from morn till night."

B.—*Knowledge of Country.*

(*a*) "I can truthfully state that I learnt more in a month of practical experience about the people of the country and the way their lives differ from those of townsfolk than I would by reading many books on the subject. One thing that struck me was that each in his own way is indispensable."

(*b*) "I learnt much about country people and the country-side. Some of the factual knowledge will, I suppose, be forgotten, but the impressions formed during our month's stay will no doubt remain with us all our lives."

(*c*) "As soon as I arrived home my parents and I had a good discussion on what I had gained. My father was really surprised when I told him all I knew about agriculture. We own some land and I must say that I take more interest in it now than before the camp."

(*d*) "Towards the end of the Camp we could nearly all name the wildflowers in the district. I personally was not so interested in bird-life, but others were."

(*e*) "It was really amazing to find how many various jobs there are to do on a farm."

(*f*) "I should never have realized that there was so much to do while the crops are growing and that it took so much time to weed onions."

C.—*Farm Work.*

(*a*) "I enjoyed the farm-work very much even though it was often hard and monotonous. I think it gave many of us an idea of what really hard work was for the first time in our lives. We never grumbled when it was time to go and work, but we were always glad when it was time to go back to Camp."

(*b*) The work in the fields, in my opinion, did us good and I'm sure we grinned and bore it whether it was wet or fine. Some of our number were not particularly fond of hard work but there were not many real slackers."

D.—*Friendship with Country People.*

(*a*) "We became firm friends with many of these kindly country people who were only too willing to help us in every possible way. I shall never laugh or scoff at country people or anything concerning them, for I have too much respect for them."

(*b*) " If we wanted to know about a special crop or weed or diseases, we only had to ask some farmer or labourer and he would give a long, slow explanation. Others might answer in a word or two, but none of them refused to give a reply even if it was—' I'm sorry but I don't rightly know.' "
(*c*) " During the social we had on the last evening at Camp I was glad that the village boys were allowed to join in with us, because it helped to create a friendship between town and country children.
(*d*) " I found country people much friendlier than people in town and much more eager to help one."
(*e*) " Many of the farm labourers on the farms at which we worked conversed with us on many subjects and they seemed under many illusions concerning ' us townies.' It quite surprised them to find that there were many houses in the city without hot and cold water. It also surprised me to notice the many things which farm workers didn't know about their own jobs. Some of them didn't know what variety of parsnips or cabbages they had been manuring and weeding all through the season."

E.—*Love of Country.*
(*a*) " I can enjoy a country walk better and note many things which I would never have dreamed of looking for before."
(*b*) "After living most of our fifteen years in a smoky, grimy and unhealthy city it came as a very pleasant change to live, if only for four weeks, in the country with its beautiful greens and browns, healthy air and lovely scenery."
(*c*) " Lessons were a great source of enjoyment to me, especially the Nature Study lessons, which I had had nothing to do with for over two years. Gathering flowers and looking them up in illustrated books and magazines was how I spent some of my spare moments."
(*d*) " Geography was very interesting and I explored the district almost field by field."
(*e*) "As I took a keen interest in architecture when I was at my previous school, I was naturally interested in the churches at Bidford and Wixford. The revision of architectural styles brought back to my memory all the facts I learnt a year or two ago as well as giving me new ideas to think about."
(*f*) " I never cared much for the country but now if I were given another chance of going to a farming camp I would jump at the opportunity."

F.—*Evening Prayers.*
(*a*) " I think the part of camp which I enjoyed most was the prayers and flag-lowering at the end of the day. It seemed to signify so much, and, if during the day we had been harassed or worried, the simple easily understood prayers seemed to put things in their true perspective."
(*b*) " I have some very happy memories of the flag-pole which was our general meeting place and also our place of worship—memories which, I hope, will never be forgotten."

G.—*Self-Reliance.*
(*a*) "At Camp I had to fend for myself. My sisters noticed the difference when I returned, for I did more for myself and was more independent. I have the feeling within myself that if anything should happen I could get on in life more easily."
(*b*) " In the camp itself we learnt to live in a community and not as individuals. It was good training for some of us to do our own washing up, fetch our own water from the pump, make our beds and keep our kit and tents tidy. In fact, we all tried to keep our own respective tents the tidiest and there was keen competition among us."
(*c*) " Here we had no mother to look after us and to put everything ready for us. The Camp certainly taught me to appreciate my mother."

H.—*Camp Friendship.*
(*a*) "A lot of us, although in the same Form, did not know one another well, but when we left the Camp we knew everybody, whether in our Form or not. We had many friends when we came back to school and had plenty to talk about or think about."
(*b*) " This Camp School idea brought us into closer intimacy with the staff and helped a great deal to show us that the staff (also those at Aston) wish us to consider them as friends and advisers and not as dictators."
(*c*) " What I gained most was a friendship with other boys and girls which will still be strong in many years to come."

(*d*) "We realized that the best way by which we can gain for ourselves the good opinion and goodwill of all is to offer a friendly willing hand, to share and share alike, and to keep a happy smiling face."

(*e*) "I gained the knowledge of how I could mix with a crowd of boys and girls. At school I made friends but it is different when you live with these friends for four weeks. It is then that one's character is found out. You find who thinks of others and tries not to hurt their feelings even when they are fed up themselves."

XIII.—Improvements suggested by pupils.

Of course the development of an ideal Farming Camp School will be a gradual process requiring adjustment based upon experience gained during a number of years. Although the essays of the pupils continually emphasise the favourable aspects of our first attempt, they do indicate clearly one or two modifications which would be desirable in future years. For instance, it is evident that the enthusiasm of the staff led them to attempt too much during lesson time. They were naturally anxious to take full advantage of the four weeks stay in the country, but an atmosphere of speed and rush is not conducive to understanding and appreciation. The reactions of some pupils are indicated in the following comments:

(*a*) "In my opinion the curriculum was too full and the work had either to be rushed and spoilt or worked through slowly and left unfinished."

(*b*) "I think that most of us had to forego one or more of the permits to leave Camp and stop in to try and catch up with the school work. This was primarily due to trying to crowd too much into the hours allotted to school work."

(*c*) "Our Library period was taken up in trying to answer the 'quiz' of 500 questions which was given at the beginning of the Camp. We had quite a lot of fun answering the questions and the farmers were helpful. Time was the trouble as regards lessons. We had nowhere enough time to finish all the work that was attempted."

(*d*) "If we had been given less to think about we would have had more time to think about the more important things."

The comments of the pupils are helpful in another direction. The children were busily engaged either on school work or on farm work from 8-30 to 5-30 on weekdays and arrangements were made for games and other activities on Saturday afternoons. Many parents spent the greater part of Sunday at the Camp and in consequence the children had very little time to spend as they wished. There can be too much leisure but it seems that last summer we erred in the opposite direction. A few of the children's comments are given below:

(*a*) "At least two evenings each week should be set apart for the children's own and then the other evenings could be arranged as the staff wished without any downcast faces."

(*b*) "I wish we could have gone out a little more on our own to other towns such as Evesham; on our own I mean, not with a party as when we went to Stratford-on-Avon."

(*c*) "I never seemed to have enough time to write letters or to read."

(*d*) "Each week we had a lecture and a film show. Invariably these occurred on sunny evenings. The nights on which we were free were often wet and we had to remain in Camp."

The food arrangements received much commendation from the children but the essays revealed one general complaint. Adults may not feel hungry just before bed-time but young campers evidently require something fairly substantial in the late evening. The following comments are typical:

(*a*) "Apart from the fact that most of us would have wished for more supper, I think the meals we had were very good both regarding quality and quantity."

(*b*) "The part of the camp life at which I was so amazed was the cooking of the meals and the food itself. I went prepared to 'rough it' but I can honestly say that I have never known food to be cooked on a large scale and to taste like home-cooking. I am afraid, however, that the quantity of supper was inadequate and on two occasions nearly everyone had difficulty in going to sleep because of hunger. I think that one Ryvita biscuit and cocoa is not sufficient for supper."

XIV.—AN ESSAY ON THE CAMP SCHOOL BY A SENIOR PUPIL.

A senior boy, who happens to be one of the most intelligent pupils we have had in the school during recent years, has written an essay which perhaps it is worth while to quote in full. It gives a complete picture of the Camp School in the mind of a pupil who has a gift for clear expression. He received no suggestions whatever from any member of the staff.

My Opinion of the Farming Camp School.

"When I reflect upon the great benefits, both educational and physical, which I have derived from my stay at Broom, I marvel that it should have taken a war to make such a camp possible. I had a really wonderful time, as did all my friends, and I consider that the camp has been of inestimable value in every way. I enjoyed every minute of my stay and I have hardly any adverse criticism to make; however, I will deal with the various aspects of the camp under the general headings of: (1) Its value to the war effort: (2) Its educational value; and (3) Its benefit to health.

"In the first month (June) adverse weather conditions rather restricted work in the fields but in July I know we set up many records between ourselves in gathering in the crops, and the food harvested made a substantial addition to the nation's larder. I have not the actual statistics of the work done by the pupils but I know that a great deal of invaluable help was given to the farmers. They were able to plant extra crops in the knowledge that they would have the labour necessary to harvest them, and fields which would otherwise have been left for other purposes were sown in preparation for our coming. As a contribution to the war effort, then, I think that the camp was a pronounced success, and I know we all experienced a feeling of great satisfaction at doing something really worth-while. The townsman, seeing his vegetables only in shops, is apt to forget all the care and toil that has gone to their production but I don't think that any of us who were at Broom will forget it. At least I know that I, myself, sang much louder this year at the Harvest Festival!

"In the educational sphere the camp marks a great step forward as an attempt to relate town and country life. We were introduced to what was to many of us a wholly new field of fascinating subjects. The lessons were interesting and varied as also were the evening lectures and I found the visits especially instructive. Things were presented in such an interesting fashion you hardly realized you were at school, yet all the time you were being given an introduction to subjects that could be profitably followed up in spare-time afterwards. The lessons gave you a foundation on which to build in future and the breaking up of the camp did not mean the leaving behind of our new interests. You also learned a great deal from working in the fields, asking questions of the farmers and talking to them.

"But the great value of the camp lay in the fact that it broadened your interests and gave you something to balance your outlook. And you need widely varied interests—a fuller and richer education—for in the mechanised world of to-day with its highly complicated structure no one can be master of everything and so the tendency nowadays is to become a specialist or expert in one field or another to the exclusion of everything else. All too often you meet the person who views everything in terms of his own trade or profession—the scientist who tries to relate life to atoms and molecules, the business man who thinks in terms of profits and losses—but it is bad if your interests become so centralised that your field of vision and understanding is restricted. And that is why I think the camp was so good—it gave you an insight into the rural world, an insight into another sphere of activities, and moreover, activities on which the life of the nation depends. Agriculture is something solid and stable, the rock on which society is based, and somehow it is that impression of changelessness and stability which the land imparts that enables you to see things in their true perspective. While I was away from the bustle of the city I had a chance of getting some of my ideas straight. The camp has taught me that nothing is 'mere,' but that everything is part of knowledge.

"In our present day town and country are tending to become separated into two isolated worlds and generally the townsman is ignorant of the life of his country brother. But you cannot separate town and country—they are inter-dependent. What is needed is something to relate the two worlds together—understanding and co-operation on both sides, and to this end what could be better than a regular exchange of pupils between rural schools and city schools at different times of the year? But, of course, that is looking rather far ahead and I am digressing.

" One thing which I consider to be a part of education is the understanding of human nature and the forming of friendships. Healthy companionship is a good thing and you learn more of people's characters by working and eating and sleeping with them than you do by any other way. I found it very interesting to watch how various people reacted under different circumstances and one can learn a great deal by it. I shall be for ever grateful to the camp for the opportunity of forming new friendships and cementing old ones.

" From a health point of view the camp was ideal. Working in the open air and sleeping under canvas made us all healthier and stronger. Some people complained that the tentage was not as good as it might have been, but I found nothing to complain of in it. Sanitary accommodation was excellent. The catering service and the food were first-class, and the system of serving found great popularity ! However, I do think that we might have had a little more substantial supper ; there were a few grouses about it.

" The benefit of the camp was clearly to be seen in everyone ; we all came back healthy, sun-tanned and 100 per cent. fit. Good food, hard work and play have built up reserves of strength and energy in us for the winter.

" Of the whole camp I have really one adverse criticism to make, and that is about free time on Saturdays. It would have been much better if we could have had a permit right through Saturday afternoon and evening and stayed out of camp for tea, as we would then have been enabled to visit Stratford or Evesham. As it was, being forced to return to camp for tea split the free time into short periods which were not of very much use. There was thus no opportunity of going very far from camp at all unless it was with an organised party (for example the visit to the theatre) and so we never had a chance to go to Evesham.

" But losses are negligible compared with gains and I can honestly say that I had one of the best times of my life while at Broom ; I gained something that I shall carry with me all through my life."

XV.—CONCLUSION.

After reading the opinions of the children who attended the Farming Camp School, one feels bound to try and continue the experiment in future years. It has to be remembered that the staff at the Camp have to carry a heavy burden and much depends upon their enthusiasm and spirit of self-sacrifice. The type of education at the Camp School presents a different problem from that at the home school, and much preparation has to be done beforehand. The success of the Camp in 1944 has been mainly due to the efforts of the four members of staff who volunteered to enter whole-heartedly into this new venture. They have earned the appreciation and gratitude of a good many parents and children, and have left with the children very happy memories of an experience which will always be associated with their school days. The Farming Camp School is certainly one of the bye-products of war which is worthy of consideration not only by farmers but also by those interested in future educational development.

My own opinion is that the educational value of the Farming Camp School is far greater than the agricultural value. However, it will be much easier to convince farmers of its agricultural value than it will be to convince parents and even teachers of its educational value. The agricultural value will be obvious to everyone but the educational value will only be realised after careful consideration. A hundred units of agricultural work will produce effects that can be seen at once, but a hundred units of educational work at a Farming Camp School will produce nothing of immediate visible value—not even a certificate. The harvest will be hidden in the hearts and minds of the children.

XVI.—SUMMARY.

1.—The Farming Camp School was held during the summer term, 1944, and was attended by about 120 boys and girls (ages 14 to 17) from a Birmingham school. School work took place in the mornings and farm work in the afternoons. The curriculum aimed at giving city boys and girls some knowledge, understanding and appreciation of the countryside.

2.—In future educational development we must keep in mind the psychological characteristics of the young adolescent and make provision for his *immediate* requirements.

3.—The Farming Camp School provides new ideas and experiences in a new environment. There is a combination of thinking and doing, of intellectual pursuits combined with and related to practical outdoor occupations.

4.—The normal school tends to become too much an instructional centre rather than an educational centre in the widest sense. The Camp School counteracts this tendency by providing a young people's society which is active, congenial and purposive.

5.—In forming character the Camp School has some of the advantages of the boarding school and experience shows that the too submissive child gains a great deal.

6.—At the Camp School work is less self-centred than in the form-room at the home school. The influence of the group in promoting service and fellowship and in developing self-control and self-discipline is therefore increased.

7.—A Farming Camp School which is co-educational gives valuable opportunities for boys and girls to work and play together and to co-operate in doing something worth while.

8.—If farm-work is to have educational value, then control and supervision by the teaching staff is just as essential on the farms as in the form-rooms. The fact that the pupils realise how important and necessary is their service on the farms also increases the educational value of the work. Much is done at the Camp School to develop real understanding and greater unity between town and country.

9.—A great deal of knowledge regarding individual pupils is gained by the staff at the Camp and powers of leadership have far more scope for expression than at the home school.

10.—A clear picture regarding the reactions of the pupils to the Camp was obtained from essays written two months after their return. What the children gained is clearly indicated in these essays. The agricultural value of a Farming Camp School is obvious, especially in war-time, but it is considered that the educational value is even greater.

BOOK REVIEWS.

The Life of Childhood: By MICHAEL FORDHAM, M.D. (Kegan, Paul, Trench, Trubner, and Co., Ltd., pp. viii+154. 15s.)

This book is labelled by its author a contribution to analytical psychology, and it is in every sense thoroughly Jungian. Even the references given at the foot of the pages rarely quote anyone but Jung or his closer disciples, though grudging reference is occasionally made to Adler and Freud. This in itself suggests a marked bias.

It covers a large field. The way in which children work out their arithmetic examples and draw their drawings, the psychology of athletics, the psychology of education, the inter-relationships in the family and between home and school, are all rather summarily and dogmatically disposed of in terms of the racial unconscious and an accommodating mythology which draws its examples from all the peoples under the sun, ancient and modern. Anecdotal case studies are given as evidence, and the theories and interpretations advanced scarcely conform to the law of parsimony. There is a shining example of a Grimm fairy tale on pp. 97-100, where, by a circular argument, illuminated by much philological and anthropological learning, the drawing of a boy of eleven is made to display all kinds of unconscious and racial fantasies. There is also a series of beautifully produced coloured plates of paintings by a child of seven in which the author spies a phallus in every brush stroke; it is very doubtful whether the expense of producing them is justified by the tenuous groundwork they give for a mountain of interpretation.

At times the author arrives at some startling conclusions which may give the prospective reader a taste of his quality: "An unsatisfactory marriage involves something seriously wrong in the life of the man and woman in that marriage" (p. 35), he writes. Nevertheless, those who delight in the wholehearted acceptance of Jungian interpretations will like this book.

W.D.W.

Man and his Fellow Men: By S. LOWY. (London, Kegan Paul, pp. 194, 15s. net.)

In a recent issue of this JOURNAL Dr. Lowy's "Foundations of Dream Interpretation" received very favourable consideration. The present volume may be equally recommended. The sub-title of the book, "Modern Chapters on Social Psychology," indicates its main purpose, which is to attempt a critical examination of some contemporary schools of psychology, to describe individual and social life in terms of affect-psychology. He writes for the general reader and for the active worker in the field of social reform; he hopes that the psychologist and sociologist may find stimulation in the book to further research and constructive criticism. The author has obviously read widely and thought deeply in analytical psychology and draws from considerable clinical experience. He writes with originality and charming modesty. The book should be read and carefully examined by serious students of social psychology. "The author advises the reader to turn first to the few pages comprising the Closing Remarks." Most readers will then feel impelled to go back and enjoy the whole book; they will receive many forcible incentives to think critically about a number of questions of vital importance to the community to-day.

Psychology and Psychotherapy: By WILLIAM BROWN, D.M., D.Sc., F.R.C.P. (Edward Arnold and Co., pp. vii+223, 14s.)

This fifth edition of a well-known book contains additional new material. The two essays on "The Control of Sex" and "The Psychology of Modern Germany" are shrewd, well-informed pronouncements upon subjects of topical and lasting interest. One of the appendices of the fourth edition has been dropped and the remaining one, containing a personal record of a deep analysis, much expanded into an informative and, from the specialist's viewpoint, highly interesting document.

As might be expected of a book which has been added to piecemeal with each new edition, the present volume reads less as a coherent whole than as a series of but loosely connected essays. It is, however, little worse for its lack of text-book completeness, since each chapter throws new light on certain aspects of psychological theory and supplements the more pretentiously complete and planned works.

The British Universities: By SIR CHARLES GRANT ROBERTSON. (Methuen, 1944, pp. 90, 4s. 6d.)

This is a revised and enlarged edition of the little book previously published by Ernest Benn. It is a scholarly survey of the history of the universities in this country, admirably written, with the bearing of the history on fundamental principles and present-day problems constantly kept in mind. The latter are more fully discussed in the final chapter headed, "Past, Present and Future." The earlier studies of the medieval century universities provide a useful survey for so short a treatise. An appendix gives the number of students in the universities and colleges. The volume is especially welcome at this time when the future of the universities and the essential nature of their functions are being so widely discussed.

Reconstruction in the Secondary School: By FRANK M. EARLE. (London, University of London Press, pp. 188, 8s. 6d. net.)

This volume appears appropriately as a very valuable contribution to the solution of some of the many difficult problems involved in the pending reconstruction in the secondary school. It might even have been more useful had it appeared earlier and had been carefully studied by many of the protagonists on the Education Act. But it is greatly to be hoped that many of those who are to be responsible for the reorganisation and administration of the schools will read this book before they proceed to implement the new Act. Teachers will naturally make themselves familiar with the accumulated facts and ideas in the volume.

Dr. Earle is eminently fitted to write this book, and it gives, in every chapter, evidence of his command of educational theory, of his possession of vision in education, of wide knowledge in mental testing and vocational guidance, of long and varied experience in the educational field, and withal a sanity and wisdom of outlook on the future, so necessary and rather uncommon at the moment.

His introductory chapter is "A 'New Order' in Education," and is a critical and well-balanced contribution. This is followed by "The Child at Eleven Plus—Method of Study," a useful, suggestive and thoughtful chapter. In the next chapter the author discusses the question of "Basis of Admission to a Secondary School—Individual Inventories," and makes excellent use of material obtained from the results of applying "Tests of Ability for Secondary School Courses." He makes many suggestions of value in this chapter. The next section deals with a very difficult problem, "The Multilateral School," and is a careful and stimulating survey. Chapter V is concerned with "Choice of Curriculum—Specialisation," and emphasises the importance of arranging the programme of work to suit the needs of the individual pupil. This is followed by a section on "Construction of Work Programmes." The two concluding chapters, "From Fifteen to Sixteen Plus—Education for Employment" and "Guidance Procedures," show the complete mastery of the subjects that always characterised Dr. Earle's work at the National Institute of Industrial Psychology. Two appendices make a fitting conclusion to a very interesting and stimulating book.

The first of these appendices deals with "Tests of Ability for Secondary School Courses." The tests are four in number and are designed to test ability in use of words, in Science, in Algebra, and in Geometry respectively. These four "Fife Tests" are issued separately at 4d. each, as are "Instructions with Scoring Keys" also at 4d. each. Both sets are published by the University of London Press.

Sex Education: By CYRIL BIBBY. (Macmillan, 1944, pp. 291, 7s. 6d.)

This is probably the most comprehensive book on Sex Education so far published in this country. The sub-title describes it as: "A Guide for Parents, Teachers and Youth Leaders." That fairly indicates its nature, for it is primarily of a practical type rather than a book for the advanced student of psychology. Not that the author is unfamiliar with a wide range of psychological reading, but he does not set out to discuss fundamental psychological points. The value for the student is lessened by the fact that the author gives very few detailed references to his quotations, and as a matter of principle has refused to include an index. This, I think, is a mistake. The author's avowed purpose is to prevent readers from studying individual points in their isolation; but it is a great deprivation to one who has read the book not to be able later to refer to special points and authors readily.

The author is the Education Officer to the Central Council for Health Education and has had wide experience in lecturing to and discussing with adults and adolescents. Some early chapters deal with the part of the parent in sex education, school curriculum and sex problems in the school. Later the author deals with the general topic as it applies to the service of youth and to the more specific problems of information about the whole range of sex development and the place of sex in social problems. All these problems are discussed in a well-balanced and practical way and cannot fail to be helpful. The appendices too, giving schemes for sex education and even sample lectures, form a valuable supplement.

NOTICES.

Owing to a great increase in the demand for the JOURNAL during 1943 it was found impossible to supply some subscribers with February and June copies. If any subscriber does not wish to retain these parts we should be very glad to buy them back at the rate paid by the Societies, which would be 2s. 6d. per copy. Copies for November, 1942, would also be welcomed. Copies should be sent to the Managing Editor, *The British Journal of Educational Psychology*, The University, Edmund Street, Birmingham, 3.

Owing to a lack of space the next section of "A List of Researches in Educational Psychology and Teaching Method," by A. M. Blackwell, is deferred until the next number of the JOURNAL.

VOLUME XV. JUNE 1945 PART 2.

FALLACIOUS ARGUMENTS FROM EXPERIMENTS ON METHODS OF TEACHING.[1]

BY S. J. F. PHILPOTT.

I.—*Introduction.* II.—*Illustrative cases.* (*i*) *The Sound Film Experiment.* (*ii*) *Historical Association Experiment.* (*iii*) *Two Teaching Methods varying in correlation with the Control.* III.—*Other possible cases. Conclusions.*

I.—INTRODUCTION.

SOME methods of teaching are occasionally recommended on the ground that although they may not favour the bright child as much as one would have expected, they are nevertheless valuable in that the lower members of the class seem to profit. Sometimes it is even urged that the given method is so good with the dullards that it may be raising them out of the stupid class.

The object of the present article is to stress the fact that this argument of the "pushing up of extremes" is usually fallacious. It can be advanced in respect of any and every method of teaching ever devised. Moreover, it can be reversed. By merely re-stating and re-arranging the figures, and without altering a single mark as given to individual children, it can be made to seem that the given method is no longer pushing up the dullards. On the contrary, it can be made to seem that they are being pushed down in the scale. If one and the same set of figures seems now to push the dull child up, now to push him down, then clearly there is something wrong in the method of presentation.

The statistically-minded reader will already have seen that regressions are in question. More formally, therefore, our main object can be expressed by saying that we are concerned with fallacious conclusions derived from "regressing data," conclusions as they arise in everyday problems of educational theory and practice, whether in common room debates or in the more formal setting of conference hall or printed page.

Having mentioned common room disputes it is not without interest to note that in regressions we deal with matters where people seem to go adrift more easily than in many other lines of argument. It would seem that the common sense of our age is here sometimes at fault. For common sense is not something unchanging and eternal. It is always behind the times; always in the process of catching up. It used to be the simplest of common sense to placate the spirits of evil before undertaking a new venture. It is not so to-day, in the best circles at any rate. But with regressions John Citizen often goes wrong. One of the problems of this present stage in the evolution of common sense is, therefore, to teach John Citizen properly to handle regressions. It may not be too presumptuous to hint that one of the objects of this present paper is to help some of his instructors to discover where the dangers lie.

Regression is best illustrated by the classical case of the statures of fathers and sons, the case where Galton first introduced the term. Let all the fathers in a given country be split into upper and lower sub-groups, the tall and the short. Let the average stature per sub-group be (say) three inches above and three inches below the mean of the race as a whole, an inter-sub-group difference of six inches.

Now let the sons of those men be measured (when full grown). Will the sons average out to the same figures as their fathers? The answer very definitely is negative. The sons of tall fathers will probably average about one-and-a-half inches above the mean, sons of short fathers being the same amount below, an inter-sub-group difference of but three inches. In other words, the sons of tall (or short) fathers also tend to be tall (or short).

[1] An expanded form of a paper originally presented in a symposium on the Educational Significance of the Cinema and Wireless. (Joint Meeting, Psychology and Education Sections, British Association). Cf. Annual Report, 1938, p. 138.

But they average out to figures that are nearly enough half of those of their fathers (when measured as deviations from the general mean).

Galton used the term regression to cover the facts, using it in the sense of a regression towards mediocrity. The sons of tall fathers go down, the sons of short fathers go up, mediocrity being the goal in either case. The term regression is not entirely happy when so used. Still less so is the notion of a movement. The authors of certain researches on teaching methods have spoken of raising the dull child up to normal levels, or words to that effect. It sounds better than pushing him towards mediocrity. But again, the notion of moving or raising the child is suspect. However, there is no need to discuss terms of the kind for the moment. Our present task is to introduce the problem.

The main facts about regressions can be most quickly fathomed if we try to envisage the meaning and nature of sub-groups such as those of fathers and sons mentioned a moment ago. Let us, therefore, name them explicitly as " tall fathers " and " short fathers " respectively, with corresponding " sons of tall fathers " and " sons of short fathers." By so defining them we make clear that the sub-groups of sons are not of the same type or pattern as those of fathers. In the one case, classification is by the proper or personal statures of the fathers concerned. The sons, on the other hand, are classified in terms of the statures of their fathers, a very different thing.

If this difference is once grasped, much of what we shall have to say will be obvious, In this present example, it is obvious that not all " sons of tall fathers " are themselves tall. Some are short. The adding in of these short sons will inevitably *reduce* the mean stature of that sub-group. Similarly, there will be a number of quite tall men among the " sons of short fathers." They will tend to *raise* the mean score for their sub-group. It is perfectly obvious, therefore, that the mean statures of the sub-groups of sons must regress towards the mean, the one falling, the other rising.

An important aspect of things is uncovered when it is realised that regressions go in pairs. The control classification above was in terms of fathers' stature. But why did we make it so? It could as legitimately have been made in terms of sons' stature. Consider, therefore, the effect of making the control classification in terms of sub-groups " tall sons " and " short sons," fathers then being classified as " fathers of tall sons " and " fathers of short sons " respectively.

Without further argument, we may perhaps be permitted to urge that the inter-sub-group difference will be six inches as far as sons are concerned. It is the fathers who now regress, their inter-sub-group difference falling to three inches. Yet the fathers are the same ; the sons are the same. The only thing to change is our system of grouping them.[1]

[1] A more formal note will not be out of place. As is well known, regressions are associated with correlation. Had, for example, the correlation between fathers and sons been perfect, the tallest father in the world having the tallest son, and so on down the scale, then the coefficient of correlation would have been r=1·00 and there would have been no regression. It is because the correlation is imperfect or incomplete that regression occurs. In the matter of stature as between fathers and sons it is about r=0·51.

A regression can be expressed in terms of the formula :

$$y/\sigma_y = r.x/\sigma_x \qquad \ldots\ldots \text{(i)}$$

where x and y are the statures of a typical father and his son (expressed as deviations from the means of all fathers and all sons respectively) σ_x and σ_y being the standard deviations of the two populations.

If the said standard deviations are equal we can ignore them. The formula then becomes quite simply

$$y = r.x \qquad \ldots\ldots \text{(ii)}.$$

It is this simple form that will be assumed in the text.

To illustrate the use of the formula, suppose we take a group of fathers all 8-in. above the mean of the race. What will their sons average? By formula (ii) we get $y = 0{\cdot}51 \times 8\text{-in.} = 4{\cdot}08\text{-in.}$ In other words, the fathers being 8-in. above the mean, their sons will average 4·08-in. above the mean.

When r becomes negative, regression goes beyond the mean, tall fathers tending to have short sons, and vice versa. If, e.g., the correlation were $-0{\cdot}30$, then fathers averaging $+3$-in. from the mean will have sons averaging $-0{\cdot}30 \times 3\text{-in.} = -0{\cdot}9\text{-in.}$, i.e., approximately one inch *below* the mean of the race.

It should be noted that regressions do not seem to obey the ordinary rules of algebra. They occur in pairs of the form

$$y = r.x \qquad \text{and} \qquad x = r.y$$

[*Footnote continued on next page.*

So far we have illustrated in terms of things physical. Consider now a case where physical measures of stature are compared with measures of musical attainments. The correlation between stature and musical attainments is low. Call it zero. Assume further that a typical population of citizens has been tested for musical attainments, being divided in consequence into upper and lower (musical) sub-groups. What now will be the average stature of those (musical) sub-groups?

The essential point is that with zero correlation there is no reason why a tall man should be more musical than a short man; there is no reason why a man of high (or low) musical attainments should be tall rather than short. It is, therefore, no wonder that mean statures in upper and lower (musical) sub-groups will be equal. In other words, the inter-sub-group difference shrinks to zero when the correlation is zero. Regression is complete.

As a last example here, consider the relation between two purely mental things. Let a population of children be divided into upper and lower sub-groups in terms of a standard intelligence test. Let the inter-sub-group difference be 32 points. Now let them be given a standard arithmetic test, a test using the same scale of marks as the intelligence test in question. (This is to ensure equal range of marking on either side, with consequent equality in standard deviations.) What now will be the inter-sub-group difference in arithmetic? Will it be 32 points as in the control?

The answer depends on the correlation between arithmetic and intelligence, as measured with the given tests and with the given population of children. Assume it to be $r=0{\cdot}50$. At once we can say that the inter-sub-group difference in arithmetic will be $0{\cdot}50\times 32=16$ points.

With these few examples in mind we can pass to a consideration of the way in which such figures can be misinterpreted. The first fallacy can be called that of "pushing in the extremes." If, in each generation, the sons regress by a half as compared with their fathers, then—quite wrongly—we might be tempted to argue that within quite a few generations the race will regress completely to mediocrity in stature, all men being equal in this respect. A golden age of equality in stature will thus seem to lie in the not too far distant future. Such a notion would be completely false. Regression is a fact. So also is it a fact that the range of human stature remains much the same from age to age. It goes without saying, therefore, that we ought not to attempt an explanation of the one fact by denying the other. Both must be accepted as true, and an explanation framed to cover or contain both.

The fallacy behind the "pushing in" argument is seen in all its nakedness if we return for a moment to the example of stature and musical attainments. We have already noted that upper and lower sub-groups in musical attainments will be equal in stature on the average. Does this mean that a musical training stimulates the growth of short people, making them grow up to average stature? Does it mean that tall people become short as their musical education proceeds until, at last, they too are of but average stature? Thoughts of the kind are completely nonsensical. Adult people do not change in stature in this way. Unfortunately, as we shall see in a moment, arguments of the kind do not seem as absurd when applied to purely mental characteristics.

The schoolboy would be troubled if given a pair of equations of the kind. If for example, $y=\frac{1}{2}x$, he would want to make $x=2y$. In fact, $x=\frac{1}{2}y$. This apparent flying in the face of common sense is quite simply explained in the text above when we illustrate the regression of sons on fathers and fathers on sons. Thus for example, we have said in words that "sons of tall fathers" regress by a half when compared with "tall fathers." In symbols $y=\frac{1}{2}x$. We have further noted that if we re-distribute the sub-groups then "fathers of tall sons" will regress by a half when compared with "tall sons." Symbolically, $x=\frac{1}{2}y$. In other words, x and y have changed their meanings. It is no wonder the algebra seems strange.

It was noted in the text above that the term regression is not altogether happy when used statistically. The formulæ (i) and (ii) illustrate that point, bringing out yet another way in which the technical problems involved may seem to run counter to common sense.

In the Galtonian usage, regression increases as correlation decreases. There is an inverse relation. But the two formulæ just mentioned imply a direct proportion. For y falls as r falls. "Regression" as here measured is directly instead of inversely related to r. The difficulty does not trouble one in practice, but it adds just one more element of confusion for the layman.

The second fallacy with which we shall deal may be called that of " pushing out the extremes." A moment ago we derived the notion of a future golden age of equality from the regression of sons on their fathers. Consider, therefore, the other possible regression, namely that of fathers on sons. Pondering it, we get the picture of a series of generations stretching back into the remote past, generations in each of which fathers regress on their sons, generations in each of which tall sons have fathers shorter than themselves on the average, short sons having fathers taller than themselves on the average. Clearly, the general notion is that of a golden age of equality of stature in the not too remote past.

There is here, then, a first statement of the first and second fallacies. The one leads to the thought of a golden age in the future, the other of that same golden age in the past. Another way of picturing the second fallacy is to make it cover what happens in the future. Clearly the apparent effect will be for giants to get ever taller, dwarfs ever shorter, until, in a very real sense, there will come an age when the tallest members of the age walk with their heads literally in the clouds while their shortest brethren get lost in the jungle of grass at their feet. Our terms " pushing in the extremes " and " pushing out the extremes " derive from this forward looking picture. The first fallacy, looking forward, makes the extremes move in ; the second, looking forward, makes them move out.[1]

The third form of fallacy is one of interpretation of the movements as such. It attributes the apparent changes to the individuals concerned, saying that short men are literally getting taller within their own lifetime ; tall men literally shrinking until they finish up inches shorter than they were to begin with. Suggestions of the kind are not likely to be made in practice as far as *physical* statures are concerned, but, as will be seen in a later section, it has actually been urged that given teaching methods increase the *mental* stature of given children. The object of this present article is to urge that such interpretations in terms of changes in mental stature are as ill-advised as would be claims that, by taking music lessons, man can add even a fraction of a cubic to his physical stature.

While attacking one type of error we must not fall into another. There are laws behind regressions. They are not simply and solely a matter of juggling with figures. On the contrary, it is unwise juggling with figures that obscures the real meaning of regressions. In the case of stature, we are faced with the laws of heredity. And analogously with other cases. It follows that we must not *ignore* regressions. The point is that we must *understand* them. Above all, material subject to regression must *not* be handled as though it were non-regressing, There are enough troubles in the handling and interpretation of figures without adding to them by sheer carelessness.

II.—Illustrative cases.

In so far as quotation is here made from reports of actual investigations, I would hasten to say there is no desire to impeach those reports in respect of their main findings. Granted there were fallacious arguments, from regressing data, that does not invalidate the rest of the work. I make the point the more readily—and the more anxiously—because the said reports are so full of valuable material of one kind and another.

(*i*) *Sound Film Experiment.*[2]—This was designed to show how sound films (as distinct from the silent film) can be used under classroom conditions. It was not desired to trouble the teachers with too many experimental or statistical details. The request sent to the schools, therefore, was that the children should be taught by means of given films, being thereafter tested for amounts learned. The schools were further asked to send in the results as average scores for (*a*) bright or normal children and (*b*) dull or retarded children.

[1] An interesting point here is that if Nature is to keep the extremes of stature constant from age to age then the sons of the tallest (or shortest) men in the world in any given generation can only vary—if at all—by moving in towards the mean. For were they to move outwards they would increase the actual range of stature, which, by hypothesis, we have just supposed to remain constant. It is important further to realise that *if* correlation is imperfect, i.e., if regression occurs, then the failure of the sons of tall (or short) men completely to replace their fathers in this sense must be compensated by an outward movement from the centre, sons of men of average stature moving up and down to fill places near the extremes that would otherwise be left empty.

[2] *Sound Films in Schools*, 1932, Schoolmaster Publishing Co.

The scheme was simple in conception, But we note at once there was a splitting into sub-groups in terms of a control. Upper and lower (brightness) sub-groups were compared in terms of their mean scores for film work. In consequence, we must expect regression. As obviously, we must expect the first and third fallacies, namely, those of pushing in the extremes and of supposed changes in the individual children concerned.

Consider, therefore, the results claimed in the report. In it were quoted, as typical, the findings of one of the schools concerned (boys' secondary). Speaking of the work of his school, the head master said :

> " Ordinarily we should have expected a difference of say 30 per cent or 40 per cent"...(between averages for upper and lower sub-groups)..."the striking thing is that the difference has been reduced to 11·4 per cent " (*loc cit p.* 52).

Whence he went on to conclude :

> " (*a*) Possibly the use of sound films will *narrow the gap* between the boys ordinarily classed as of lower intelligence and the boys of a higher order of intelligence.
>
> " (*b*) Possibly by gaining the attention and enlisting the interest of certain classes of boys, *the sound film may help to remove these from the ' stupid ' class.*"

After quoting other comments of the same kind with approval, the main report went on to summarise as follows :

> " The backward and retarded child is one of the major problems in education to-day . . . it is the claim of this report that an instrument has been found to arouse the desire for knowledge that is dormant—not non-existent—in children of this type . . . We, therefore, believe that scientifically constructed educational films may prove of the highest value in *lessoning the distance which at present lies between the normal and the retarded child* " (pp. 60-1).

The italics are mine. They indicate statements in which the first and third of our fallacies are present, namely, that the extremes have been pushed in ; that this is due to actual changes in the children concerned.

The case could perhaps be left at this, for enough has been said to indicate the significance of such interpretations. But it will be of interest to show how the conclusions might have been worded had the second and third fallacies been envisaged instead of the first and third.

In the case of the statures of fathers and sons, it was shown that we can either postulate a movement towards equality of stature, or alternatively, a movement outwards towards greater extremes of tallness and shortness. In the same way, it can be argued that the use of sound films either means a tendency towards uniformity of mental stature, or alternatively, a tendency to push the extremes outward. Had this second argument been in mind, the Sound Film Report might well have been worded as follows :

> " The bright and able lad is one of the major problems in education to-day. On our leaders we depend. It is the claim of this report that an instrument has been found to push the bright lads even further forward . . . we believe that scientifically designed educational films may prove to be of the highest value in increasing the distance which at present lies between the bright child and the more average member of the population . . . "

I feel somewhat apologetic for thus stressing the point, but it is vital that the full weight of the alternative regression—and alternative fallacy—should be brought into account. If the one regression has been used in the argument the other must be given equal prominence. If the one apparent movement has been mentioned the other must be mentioned as well. The tendencies to raise the dullard up and to depress him are co-equal, equally valid and equally misleading—if stated singly.

Before leaving the case it will be as well to look at the figures. There are not many in the report, and certainly not enough to enable regressions to be illustrated as one would wish. As it happens, we shall introduce hypothetical figures in Case (iii), and opportunity will be taken there to illustrate some of the problems of this present section a little more fully. But we can at least look again at the few figures we have already mentioned.

The head master concerned assumed that *if* his boys were examined in almost any subject they ought to fall into upper and lower sub-groups differing in their mean scores by about 30-40 points. Call it 35 as a round figure. In this he was probably justified. He no doubt verified by turning out some typical class lists, finding from them that boys coming in the top half of the class do seem to average above 35 points more than those in the bottom half.

Suppose therefore that we accept 35 points as typical. Suppose further that this is the figure by which they would have differed had he tested them for " brightness " before the sound film experiment was undertaken. So far, so good. Now comes the problem of regression. What is the correlation between " film scores " and " brightness "? The Sound Film Report does not say. Fortunately, the Historical Association work mentioned in Case (ii) below gives some typical correlations between film work and intelligence. They vary from class to class, but average round about 0·33. If we assume this figure we are set for a check on the Sound Film figures.[1]

The sub-groups differ by 35 points, or thereabouts, as far as the control is concerned. How now ought that inter-sub-group difference to shrink when we compare the sub-groups in respect of a task correlating 0·33 with the control? Clearly, it should regress to

$$35 \times 0 \cdot 33 = 11 \cdot 7$$

The head master reported an actual difference of 11·4 points. Agreement could hardly have been closer, especially as there is so much guesswork in the figures.

As a last point here, it should be noted that several things ought to have aroused suspicion. One was the use of the terms dull and bright, whether in elementary or in secondary school populations. The findings were apparently the same in both kinds of school. Yet clearly the dullard of the secondary school might well rank as a bright lad in an elementary setting. Why, then, an automatic equating of dull secondaries with dull primaries? Or thinking of the individual children, if a dull secondary has his interests awakened when seeing films in a secondary school setting, must he automatically lose that interest if he is transferred to an elementary school where he would be in the bright sub-group? And if not, why not? An answer to these questions will be found when we come to Case (iii). Here we raise them to show the kind of thing that should have made the authors of the sound film pause.

Another thought that should have aroused suspicion is that we cannot get a consistent explanation of the apparent facts. The notion of interest is invoked to explain why the dull sub-groups show signs of an upward tendency, but why are the brighter children not affected as well? One could invent reasons. Take for example the problem of stature. It could be argued that regression of sons when compared with fathers is a matter of vitamins. If nowadays we give them to babies, then those by heredity predisposed to shortness may overcome that tendency, becoming tall. To explain why those born with a tendency to tallness should at the same time regress towards medium stature we need only suggest that, enough being as good as a feast, any excess of stimulation acts as a deterrent. All such arguments are clearly too facile. The writers of the Sound Film Report were cashing in on the apparent gain to the dullard. Arguments as why the dullard gains were of the nature of rationalisations. And one can rationalise quite easily.

Case (ii) Historical Association Experiment.[2]—The experiments here fell into two parts, formal and informal. With the formal work we have no quarrel. It was from it came the correlation of 0·33 between Intelligence and Film work quoted in the last case. The informal work depended on comparisons made by the teachers concerned. Children were graded by them (usually on an A B C D scale) for work done in their ordinary history lessons. They were again marked for work with historical films. It was here that regressions occur, for the ordinary work was taken as a control. That being so, we may anticipate

[1] The reader may perhaps note that we have said nothing of standard deviations. The matter was not overlooked. The Historical Association figures cover a number of cases where deviations were quoted. On the whole, there was nothing in it either way. Film work tends to vary as much as ordinary work. It therefore seemed safe to ignore deviations in the above discussion.

[2] *The Value of Films in History Teaching.* F. Consitt. Bell and Sons. 1931.

comments implying a pushing in of the extremes. In fact, they occur, being quite numerous in the reports from the various centres. In consequence, it is not surprising to find the main report summarising as follows:

> "*Effect on the Backward and the Apt Pupil.*—(a) Many backward children noticeably profit by the historical teaching film; they take more part in oral lessons, show a greater group of fact and sense of atmosphere in essays after the films and remember more than usual.
>
> "(b) On the other hand, some children, usually near the top of the class, do less well after seeing a film than after the ordinary type of lesson" (*loc cit*, p. 380).

It will be interesting to look at the results. Of the many tables of the kind printed in the Report, we may take the liberty of quoting the one here given as Table IA (*loc cit*, p. 235).

TABLE IA.

(ORDINARY WORK AS CONTROL.)

Same Grade.	*Higher Grade.*	*Lower Grade.*
1 in A	2 B to A	3 A to B
1 in B	2 C to B	1 A to C
2 in C	1 C to A	1 A to D
2 in D	2 D to C	2 B to C
		1 C to D

TABLE IB.

(TABLE IA REVERSED, I.E., FILM WORK AS CONTROL).

Same Grade.	*Higher Grade.*	*Lower Grade.*
1 in A	3 B to A	2 A to B
1 in B	1 C to A	1 A to C
2 in C	2 C to B	2 B to C
2 in D	1 D to A	2 C to D
	1 D to C	

The general scheme was simple. Taking marks on an A to D scale the teachers simply reported whether children had moved up or down in film work as compared with their standing in ordinary work. Table IA shows for example how a Form IVA behaved (21 boys). Six remained in the same grade, whether for ordinary or for film work. Seven went from a lower to a higher grade, eight moving in the other direction. And as noted in the Report, it was the A and B children who tended to go down, the C and D children tending to go up.

So far, so good. And as long as a Table of the kind is allowed to stand alone, and as long as the regression obvious in it is quoted alone, then so long will the conclusions seem to be as stated.

In fact, only one regression is invoked; the first and third fallacies are dominant. The matter could be left at this point, but just as with the last case it will be interesting to elaborate for a moment, bringing in the alternative regression and the alternative fallacy.

This time we can illustrate a little more fully from the actual data of the Report concerned. Table IA is so framed that it shows how the children change when they pass from ordinary work (as the control) to film work. Suppose now we re-express it, showing how they pass from film work (as the control) to ordinary work? The scores will be the same, everything will be the same, save the apparent direction of movement.

Table IB consists, therefore, of the symbols shown in Table IA. differently arranged, movements indicated in the second column of the first table appearing in the third column of the second table, and *vice versa*. Entries in the first column are, of course, the same in both tables.

In Table IB it will be noted that children getting A and B for film work (control) tend to move down in status as they change over to ordinary work. In similar fashion, those getting C and D for film work step up in the scale when they change to ordinary work. In other words, *it is now ordinary work that favours the dullards, correspondingly depressing the brighter children.* Having reversed the apparent movement, we get the alternative regression and the alternative fallacy.

The point now is this. Had this way of stating the figures been in mind when the report was written it might well have run as follows:

> *Effect on the Backward and Apt Pupil.*—(a) Very many *bright* children noticeably profit by the historical teaching film. They move down in their scores as soon as they

turn to more ordinary types of lesson . . . (b) On the other hand. some children, *usually near the bottom of the class*, do less well after seeing a film than after the ordinary type of lesson. Where they would get C in ordinary work, they get D in film lessons.

Explaining or rationalising such findings we might justify them by urging that the slower tempo of the human voice suits the dull children better than the more speedy film. But there is no need to go further with that aspect of things. The danger of rationalisation was mentioned in Case (i). Here it is sufficient if once more it has been demonstrated that results can be set out or arranged in two ways; if it has been shown that the two forms of statement or tabulation lead to diametrically opposed conclusions.

Case (iii).—Two Teaching Methods varying in correlation with the Control.—The inquiry is here extended to cover cases where there are two (or more) teaching methods to be compared in terms of some one control, as for example, intelligence. Quite a number of problems arise, some better viewed in the light of cases (i) and (ii), some better handled from other points of view.

Let a population of children be split into sub-groups A, B and C of high, medium and low intelligence respectively, a standard intelligence test being used for the purpose. Let the mean scores per sub-group be as in the second column of Table IIA.

TABLE IIA.

Sub-Group.	*Score Intell.*	*Score Test X*	*Score Test Y*	*Gain (X-Y).*
A	66	71	61	10
B	50	55	45	10
C	34	39	29	10
Diff. (A-C)	32	32	32	—

NOTE.—$r_{xi}=1{\cdot}00$; $r_{iy}=1{\cdot}00$.

TABLE IIB.

Sub-Group.	*Score Intell.*	*Score Test X.*	*Score Test Y.*	*Gain (X-Y).*
A	66	63	53	10
B	50	55	45	10
C	34	47	37	10
Diff. (A-C)	32	16	16	—

NOTE.—$r_{xi}=0{\cdot}60$; $r_{iy}=0{\cdot}50$.

At the foot of that second column is a difference symbolised as (A-C). It is the difference between the mean scores of sub-groups A and C. There is here a link with Case (i). It will be remembered that a difference of 30-40 points was there expected between mean scores for the upper and lower sub-groups respectively. Here we have taken 32. It is true that we now have three sub-groups as compared with two in Case (i), but that is immaterial.

The next problem is to introduce scores for teaching methods X and Y. Let it be assumed that the children are taught by those methods, being thereafter given test X and Y to see what they have learned. Let mean scores in those tests be as given in the appropriate columns of Table IIA.

A basal assumption with all tables in this present case is that standard deviations are equal throughout. We need, therefore, only consider the effects of change in correlation.[1] A further assumption with Table IIA is that correlations are perfect. That being so, it follows at once that the (A-C) differences whether for Test X or Test Y will be equal to that for the control, and, as will be seen, the figures are such that (A-C) is 32 points throughout.

[1] Tables of this case were quite simply constructed. To give Method X an advantage, its mean over the population as a whole was taken as 55 compared with 45 for Method Y. The same figures were assumed for the middle sub-group. Sub-groups A and C were next assumed to fall symmetrically on either side of B, and distant from it 16 points in mean score, a total (A-C) difference of 32 points. The effect of lowering the correlation in Tables IIB, IIc and IID was indicated by reducing the (A-C) difference by a half if $r=0{\cdot}50$, and so on. It should be noted that the means for sub-group B were constant throughout. This was essential. Regression being towards the mean, the mean value over the population as a whole must not change.

There is here represented the state of affairs expected (but not found) by the authors of the Sound Film Report. They did not find it to be so in their experimental figures because correlation was not perfect. It never is in everyday life. In this present Table IIA we are. therefore, simulating a degree of perfection that is sometimes expected—as in the Report quoted—but never found in reality.

So far, then, the analogy has been with Case (i). Generally speaking, any comments we shall make on (A-C) differences are best envisaged in terms of that earlier example. In this present case, however, we have a further task, namely, to study differences between two given methods. They are given in the column headed Gain (X-Y). Just as with (A-C) differences we have to inquire whether the apparent distance between sub-groups A and C has diminished, so here we have to ask whether the (X-Y) gain varies as we pass from upper to lower sub-groups, the essential problem being whether methods seem to change in relative value or effectiveness when used with dull or bright sub-groups. Anticipating the answer, it can be said at once that we shall find such apparent differences; differences as easy to misinterpret as those already dealt with in earlier cases.

What then can be said of (X-Y) differences in Table IIA? Whether for upper, middle or lower sub-groups, the gain is uniformly 10 points in favour of Method X. With perfect correlation, therefore, and with no real tendency for the methods to differ in relative effectiveness, the (X-Y) gains can be trusted to give a true picture.

Table IIB shows what happens when the correlations fall to 0·50. Regression having set in, we must expect a corresponding fall in (A-C) differences. At this point, too, we might (in other circumstances) be tempted to invoke the first and third fallacies, arguing that Methods X and Y seem both to be favouring the duller sub-groups. But there is no need to go over that ground again. It is more important to ask whether this fall in (A-C) means a corresponding change in (X-Y).

As it happens, the (X-Y) differences are still at constant level, showing a gain of 10 points to Method X throughout. So that the two methods are of the same relative standing whether employed with bright, medium or dull children. Put generally, it would seem that the (X-Y) difference remains constant as long as the correlations between the methods and the control are equal.

Tables IIC and IID show what happens when the correlations vary. The (X-Y) differences vary markedly. In Table IIC, Methods X and Y seem to race ahead at the lower and upper ends of the scale respectively. Table IID has the correlations reversed. In consequence, the general picture changes round, the two methods now taking the other ends of the scale.

Put generally, the method showing the lower correlation with the control is relatively more effective with the lower sub-group, and conversely.

TABLE IIc.

Sub-Group.	*Score Intell.*	*Score Test X.*	*Score Test Y.*	*Gain (X-Y).*
A	66	59	57	2
B	50	55	45	10
C	34	51	33	18
Diff. (A-C).	32	8	24	—

NOTE.—$r_{ix}=0·25$; $r_{iy}=0·75$.

TABLE IID.

Sub-Group.	*Score Intell.*	*Score Test X.*	*Score Test Y.*	*Gain (X-Y).*
A	66	77	49	18
B	50	55	45	10
C	34	43	41	2
Diff. (A-C).	32	24	8	—

NOTE.—$r_{ix}=0·75$; $r_{iy}=0·25$.

The apparent (X-Y) gains to method X in the lower sub-group of Table IIc and in the upper sub-group of Table IID are too obvious to be overlooked. One is here faced with a quite difficult task when attempting to persuade the uninitiated listener that such gains are nevertheless illusory. They look so convincing that a shake of the head is by far the

most likely response to the suggestion that they do not mean what they seem to mean. Yet in fact, they trace directly to the same regressions as those determining the (A-C) differences. If we refuse to accept the apparent miracle behind an (A-C) difference of 8 points to Method X in Table IIc, can we at the same time accept the equally marvellous 18 point (X-Y) gain that tells the same apparent story, namely that Method X is here pushing sub-group C up more than does Method Y?

Strictly speaking the only statement that can safely be made with regard to any one of the four tables of this case is that Method X gains 10 points over Method Y on the average. It is true that Tables IIc and IID seem to show that first one method and then the other is the more effective at the upper (or lower) end of the scale. But any attempted interpretation of that fact should be hedged around most carefully with danger signals.

Incidentally, sub-group B has the same scores and (consequently) the same (X-Y) difference in each table. This will add point to the fact that we can only safely deal with averages over the whole population. (Sub-group B has the same figures as the population at large.)

Before leaving this case a few general problems can be raised. The first is that of the extent to which we can argue from one given population to other related populations. If, for example, Table IID is true of a central school (using the term to mean a school intermediate in level between secondary and elementary schools) what can we argue with regard to the kind of table likely to be produced if we experiment in (a) other central schools of the same general level and (b) secondary and elementary schools in the same neighbourhood?

The two forms of relationship can be called the horizontal and the vertical respectively. On the horizontal side the answer is simple. If IID is typical of an average central school it will be typical of most schools of that type. It is with vertically related populations that we may be led into error, for common sense once more fails us. If regression is the only thing at work (i.e., if there is no real tendency for one or other of the methods to be relatively better with bright than with dull children, or *vice versa*), then the answer will be the same for both vertically and horizontally arranged populations, namely, that the one table will be universally typical.

The two possibilities can be symbolised. Let the three populations be split each into three sub-groups, symbolised as follows:

$$A_s \; B_s \; C_s \;\vdots\; A_c \; B_c \; C_c \;\vdots\; A_e \; B_e \; C_e$$

where the subscripts mean secondary, central and elementary respectively. The common sense view would presumably be that *if* Table IID is typical of the central school population, then sub-group B_c should be a neutral centre. On one side of it should be sub-groups seeming to do better with Method X, sub-groups on the other side seeming to prefer Method Y. Symbolically

$$X_s \; X_s \; X_s \;\vdots\; X_c \; N_c \; Y_c \;\vdots\; Y_e \; Y_e \; Y_e$$

where X, N and Y indicate sub-groups doing better with Methods X and Y, or that are neutral (N) in that they are indeterminate in this sense.

Expressing the other view, namely that one table is universally typical, we get quite a different picture. The symbols now run

$$X_s \; N_s \; Y_s \;\vdots\; X_c \; N_c \; Y_c \;\vdots\; X_e \; N_e \; Y_e$$

showing that the upper sub-group of *each* population appears to need Method X, the middle sub-groups in *each* being neutral, the lower sub-groups in *each* needing Method Y.

Evidence can be sought no further away than Case (i). The sound film experiment was carried out in secondary and central schools. The Report is quite unambiguous on the results. The upper sub-group of *each* population did relatively less well with sound film teaching than did the lower sub-group. In other words, the second of the above conditions was holding.

It is important here to note that the children of any given school community tend to be graded and re-graded until they lie in quite narrow strata, layers or populations. Within a secondary school, for example, there are the various forms. In a school of any size each form is duplicated and re-duplicated. The same applies on the primary side. So that the school community of a given neighbourhood (including in that term all types of school) will be most elaborately stratified.

Symbolically, and dropping the sub-scripts, such a school system can be expressed as :

... X N Y ⋮ X N Y ⋮ X N Y ⋮ X N Y ⋮ X N Y ⋮ X N Y ⋮ X N Y ⋮ X N Y ...

where the dotted lines cut off the populations covered. The sound film experiment can now be somewhat differently described. Entering a school system of the kind, many of those possible populations were tested. In each case. the population concerned was found actually to have X N Y characteristics. That being so, the said investigation demonstrated that the system *was* of this zigzag or multifocal type. The same applies to the Historical Association work. There too, schools covering a wide range of populations seem to have been covered, and once more, the zigzag or multifocal system was demonstrated.

Carrying the matter a step further, consider what would happen if the children were regraded in such a fashion as to cut across the " populations " used in a given series of experiments. Symbolising, let the dotted vertical lines be shifted slightly, so that the populations now run :

..... A ⋮ B C A ⋮ B C A ⋮ B C A .....

Clearly, if we now experiment afresh[1] on B C A populations, we ought still to find the one table universally applicable. But the results will be different in one important respect. The most suitable methods will seem to run :

..... Y ⋮ X N Y ⋮ X N Y ⋮ X N Y .....

In other words, it will appear as though sub-groups have changed in their apparent preferences for given methods, sub-group A now seeming to profit more from Method Y, and so on. In fact, of course, the whole thing is artificial. There is no real change in preference ; there were no original preferences to change.

A problem of some importance arises when we inquire as to the degree of correlation likely to hold in narrow populations. Put generally, a correlation is maximal when it is calculated over a population as widely distributed as possible in respect of the variables concerned. If, for example, intelligence is involved, the population tested should cover all grades of intelligence, and so on. Put the other way around, the narrower the population the smaller the correlation.

This means that experiments carried out on single school classes, layers or strata, will be peculiarly subject to regression troubles, for the smaller the correlation the greater the degree of regression. It is an unfortunate fact, but it must be faced. It has repercussions in other directions that are equally unfortunate. (It is, for example, difficult to get correlations of any size from such highly selected populations as university students.) However, attending to our own immediate problems, we may look once more at the results quoted in Case (i). The head master there quoted was startled at the degree of regression met with in his results. Expecting a difference of 30-40 points, he found it shrinking to a bare 11·4 points. Realising how highly selected a secondary school form can be, it is perhaps remarkable that he got a value as high. It could well have shrunk to even smaller dimensions, and that merely because of the narrowness of his forms.

To finish the discussion, some points in the logic of the case may not be out of place. The difference between upper and lower sub-groups in any given population is purely relative. Experimentally, therefore, that is all we should take into account. In drawing

[1] There is no need to do the experiments again. It is only necessary to redistribute the old scripts and calculate mean scores afresh over the newly arranged populations.

up conclusions, their relativity should be stressed. In fact, the Reports quoted in cases (i) and (ii) tended to slip into absolute terms in their final conclusions. The terms bright and dull, relative though they may be at bottom, can yet take on an absolute meaning when we speak of bright or dull children in general.

A problem of slightly different kind is found when we inquire just why it is assumed that film teaching may raise the dullards to more respectable levels. The facts of the case seem to be that lower sub-group children gain more marks after a film test than would have been expected by their scores in an intelligence test. The argument is, therefore, that the film work is making them behave more intelligently than they behaved when doing the intelligence test proper. Or that is how it would seem the argument runs. And there is no doubt that the average person would agree to a statement in some such terms.

Consider now the *reductio ad absurdum* put forward in an earlier section. Granted that a population of adult men can be given a course of music lessons, being thereafter split into upper and lower (musical) sub-groups, just what will be the inter-sub-group difference in stature? The correlation between musical attainments and stature being negligible, the inter-sub-group difference in stature will be negligible. Does that therefore mean that lessons by the musical method can increase the physical stature of the short man? So crazy a conclusion would be rejected at once even by the man in the street. Even he would affirm at sight that stature and music are unrelated variables.

There is here put quickly and easily into a nutshell something that has to be much more carefully (and almost painfully) dissected out of the complex on the mental side. If " scores for music " and " inches of stature " are unrelated variables, why do we so easily assume that " marks in a film test " and " marks in an intelligence test " are synonymous terms?

The answer, and rightly, is that they are related because intelligence is required in the working of a film test. It must enter, to some extent at any rate. Granted that, the question arises just how much it enters. The answer is given in terms of the correlation. The more alike two things are, the higher the correlation between them. Were " marks in film test " and " marks in an intelligence test " synonymous terms, the correlation would be r = 1·00. To the extent that they are independent, the correlation falls.

We are now ready for a critical argument. To the extent that film scores are independent of intelligence scores, the correlation falls and with it the regression. *But the pushing up of the [illegible] ned by regression.* Wherefore, the apparent gain to the dullard is *not* [illegible] in him of intelligence. It is a measure of the extent to which film scores depend on factors *other than* intelligence. And not only factors other than intelligence, but factors completely independent of intelligence.[1]

III.—Other possible cases; conclusions.

Cases have been quoted from one relatively narrow field of educational work. There are other fields, whether within education or outside. One such sphere is that of selection. Outside education it occurs in industry. Inside the realm of educational psychology it shows in the vexed problem of selection for post-primary education. Regression problems are here quite easy to envisage. Consider for example a problem as follows: Let the children of a given town be divided into upper middle and lower sub-groups in terms of an intelligence test, with mean I.Q.s of (say) 60, 100 and 140 respectively. Let them be now directed into appropriate schools. Now let a check be made in terms of a new test, one correlating 0·70 with the original when tested over the population as a whole. (It is all one population, divided into three sub-groups. The point is important.) The mean I.Q.s of the three sub-groups will regress at once to 72, 100 and 128 respectively. Faced with these changes in their respective mean scores, teachers in the schools for sub-normals might well argue

[1] In a narrow population chance will play an unduly large part in determining just what a child does in a given test. If he is feeling fit and well he may come out near the top. If he is a little bored, he may fall to what would perhaps seem a disproportionate degree. So that in schools of highly graded classes we must include chance factors in the list of possible causes. They reduce the correlation and increase the regression.

that the new test is too easy, teachers in grammar schools as hotly insisting that it is too difficult, teachers in the schools for the ordinary or middle sub-group meanwhile wondering what the dispute is about, one test seeming to them as good as the other on the average.

There are many other possible cases, but there is no time to discuss them. It must suffice if we finish with a brief summary of what has already been said.

Common sense is often a poor guide when dealing with regressions. This is because some of the rules are unusual. Regression formulæ do not seem to obey the usual rules of algebra. There are two regressions, opposite in apparent meaning, and sometimes leading to apparently opposed conclusions. The uninitiated person may seize upon one and treat it as typical, not realising that had he first seen the other his final conclusions would probably have been in the contrary sense.

The argument has been mainly developed in terms of experiments on film teaching in school, experiments using a somewhat unwise method of presenting the results. Typically, a population of children is divided into two (or more) sub-groups in respect of a control (usually intelligence or standing in ordinary work). It is then given lessons by a film method, thereafter being subjected to test to see how much has been learned. The observed figures are then given as mean scores per sub-group.

It is an unwise method because if standard deviations are the same on either side (and it is a mere matter of routine to make them so) the inter-sub-group differences as so defined are proportional to the correlation between the control and the film tests in question. If the correlation is high, the inter-sub-group differences will seem to be normal (when compared with analogous figures in the control) ; if the correlation is low, the said difference will seem unduly small, disappearing altogether when there is zero correlation.

In actual practice, inter-sub-group differences in respect of film work seem to have been of the order expected if the correlation is 0·33 or thereabouts. If this correlation is assumed to be valid, the results are completely explained. Nevertheless they have, in the past, been held to mean that lower grade children are lifted up towards more normal levels when film teaching methods are used.

Discussing conclusions of the kind, three forms of fallacious argument have been noted. The first is that of supposing the results to mean an actual pushing in or restriction of the range of variation. The second, depending on the alternative regression, is that of supposing the range of variation to increase. This second fallacy is hardly likely to be advanced in practice, although it must be stressed in any discussion of the problem. The third arises when either the first or second fallacies is held to mean corresponding changes in individual children.

Generally, the less a teaching method correlates with the control the greater its apparent effectiveness in pushing in the extremes (first fallacy) or conversely (if the second fallacy is involved).

If two (or more) teaching methods are compared in terms of some one control, the method correlating least with the control will seem relatively the more effective with the dullards, the method correlating more with the control seeming better suited for use with the upper sub-group.

It has been noted in the discussion that the mind will usually refuse to come to absurd conclusions when physical characteristics are involved. By the argument used to show that film teaching pushes up the dullards it can be " proved " that a course of (say) music lessons will cause short men to increase in stature, becoming of average height. Such a conclusion would be rejected at once, even when analogous arguments with regard to mental stature are accepted without question.

Going beyond this field of research, it has been noted that regression troubles may attend the attempt to standardise lesson topics. Topics can be equal in respect of mean scores while yet not correlating equally with a given control. The same difficulty arises when using the method known as that of " equal groups." Classes giving equal scores in a preliminary test may yet correlate unequally with the given control.

SOME SURPRISING BELIEFS CONCERNING HUMAN NATURE AMONG PRE-MEDICAL PSYCHOLOGY STUDENTS.*

By LYNN L. RALYA.[1]

*Editor's Note.—The following paper has been submitted by an American psychologist, and deals with beliefs about human nature held by students of his own attending pre-medical courses at a College in one of the South-Eastern States. The conclusions drawn, of course, do not necessarily hold good of similar students in this country or in other Colleges in U.S.A. Nevertheless, the results suggest an important line of inquiry which might well be followed up in British Training Colleges, and even among teachers and parents. The author emphasises that his investigation is a preliminary survey only, and that for more systematic research his questionnaire and methods of analysis could be improved in the light of his own experience and that of others who may have attempted similar inquiries. Readers of this *Journal* may be referred to the outline of a thesis reporting on beliefs among students, written by Miss Muriel Johnson, and published in this *Journal*, Vol. XII, Part 3.

As distance made repeated correspondence with the author difficult, the Editor has ventured to omit some sentences, including two of the questions. The key answers to several of the other questions may also seem doubtful to some readers.

I.—*The individuals tested.* II.—*The test and its administration.* III.—*Treatment of data and table of results.* IV.—*Interpretation of results.* V.—*Summary and conclusions.*

I.—The individuals tested.

This study of some conceptions and beliefs concerning what we, for want of a better descriptive term, call "human nature," is based upon data gathered in the belief that such results might suggest the possible need for various shifts in emphasis with reference to the normal content of pertinent college courses—or even suggest the desirability of making changes in the course requirements, particularly for pre-medical students. It is hoped that the paper will also illustrate some of the values and weaknesses of a questionnaire or inventory of the type used.

The institutional source of the data for this report was a moderate-sized state college located in the South-East of the U.S.A. and catering for men only. With reference to the quality of the institution, it may be said that about one-third of its present faculty possess Ph.D. degrees and that the physical plant is more nearly complete and adapted to its purpose than that of most colleges and universities. It can also be stated that, during the period we are concerned with, the freshmen received by the institution were representative in scholastic aptitude, according to results obtained on the American Council Psychological Examinations, of those entering other colleges and universities in the region, and that about 45 per cent. of these entering freshmen normally graduated.

The subjects for this study were 141 of the 149 senior pre-medical students who belonged to five successive years of college classes. They were not, it would seem, unrepresentative of all of the seniors in the various years' classes of which they were members or of those seniors who were graduated.[2]

The pre-medical curriculum followed by these students ran heavily to mathematics and chemico-physical science. Practically all of the students had already taken the one

[1] The following students co-operated in the tabulation of the data used in this investigation: B. L. Bomar, J. C. Harris, C. A. Humphrey, A. H. Hurd, J. P. Jewett, J. G. Kearton, F. M. Smith, F. B. Spencer.

[2] To be more specific; when the rank order positions in college achievement of these 149 seniors in their five separate college classes were converted into percentile ranks within those separate classes and all of these percentile ranks thrown into a single distribution, the median percentile rank was 52 and the middle 50 per cent. of the percentile ranks ranged from 33 to 77.

Ranks used for those who had been graduated before the computations were made were those prevailing at the time of graduation, since these were most accessible. Most seniors normally were graduated.

or two years of offered and required work in biological science—a course in zoology. The biological course yet to be completed was one in comparative vertebrate anatomy and embryology. Only a few of the subjects had pursued any previous work in sociology and very few had taken any previous psychology.

II.—THE TEST AND ITS ADMINISTRATION.

The entire test used in the investigation consisted of 180 statements centering around, or representing, some of the more important and less technical concepts and principles of psychology, with many of the items designed to reveal the prevalence of unfounded beliefs and misconceptions suspected to exist to a considerable degree in the mental life of the subjects. Sources of information useful in the construction of the test included: (*a*) psychology texts; (*b*) various studies of superstitions and unfounded beliefs made by a number of investigators; (*c*) some knowledge and surmises concerning the misconceptions of students gained in the informal teaching of them; and (*d*) the final or preliminary results of studies of concepts and beliefs related to psychology made collaboratively by the writer.[1]

No claim is made that the concepts or beliefs to be represented were selected in a manner highly objective or lacking in arbitrariness; and it is recognized that the topics covered by the test items and the formulation of them might have been improved in some cases. The fifty-five statements or items considered pertinent to this study are indicated in a table which follows.

In the administration of the test considerable care was exercised to secure thoughtful and intellectually honest reactions to the test items. With this end in view the subjects were: (*a*) told briefly of the value of such investigations; (*b*) assured of all the time which they found necessary to complete the project; (*c*) assured that the results would not be even connected with their names, and (*d*) urged to respond in accordance with their real convictions. Furthermore, the test was labelled and called an Inventory in the hope of allaying whatever fear reactions the label 'test' might have brought about. In addition, the subjects were allowed the third response of 'uncertain,' as well as the usual two of 'believe' and 'disbelieve,' in the belief that this procedure would increase their confidence in the fairness of the undertaking and the integrity of their own reactions.

III.—TREATMENT OF DATA AND TABLE OF RESULTS.

Each statement of the test was judged at the time of its formulation to represent a conception or belief considered either desirable or undesirable in accordance with (*a*) the writer's understanding of current psychological knowledge or his judgment concerning the consensus of authoritative opinion and (*b*) his assumption concerning the interpretation which the subjects would be likely to give to it. Revaluation of the items, in accordance with the same criteria, after the project was well under way, caused a rejection of a few because of recognized ambiguities and uncertainties. Since some items are matters of controversy, a key indicating whether belief or disbelief is considered desirable is incorporated with the fifty-five statements of the study.

The percentage of subjects considered incorrect in response to each statement was computed for (*a*) the entire group of 141 subjects; (*b*) the group ranking highest in college achievements, and (*c*) the group ranking lowest. In this computation those subjects who indicated uncertainties were included among those considered incorrect—so as to simplify the presentation of the results.

[1] LYNN L. RALYA and LILLIAN L. RALYA: "Some Concepts and Beliefs Significant to the Social Sciences of Entering Freshmen and the Relation of these to Scholastic Aptitude," *Social Forces*, Vol. 20, No. 3 (March, 1942); "Some Significant Concepts and Beliefs in Biology and Anthropology of Entering Freshmen, etc. . . . ." *Science Education*, Vol. 25, No. 6 (November, 1941); "Some Misconceptions in Science held by Prospective Elementary Teachers," *Science Education*, Vol. 22, No. 5 (October, 1938).

TABLE OF QUESTIONS AND RESULTS

No.	STATEMENT. *KEY to attitudes which the writer takes as correct: B—Belief. D—Disbelief.	PERCENTAGE OF SUBJECTS INCORRECT. KEY*	All students 141	Lower group of students 40	Upper group of students 40
1	The position of the stars at the time of a man's birth determines, in part, his character	D	18	18	18
2	The ancient Greeks were born with better intellects than people are endowed with to-day	D	21	18	20
3	Man is biologically descended from a species of existing apes	D	61	58	65
4	Apes have been known to solve problems that the average three-year-old child could not solve	B	52	65	48
5	Some of the higher apes are as intelligent as the average man	D	11	10	10
6	Animals depend to a greater extent on inherited ways of doing things than does man	B	10	8	8
7	The conscience is part of man's natural equipment at birth	D	36	50	20
8	Mothers instinctively know the best ways of caring for their children	D	46	50	28
9	Most children are born bad	D	19	18	23
10	Most children are born good	D	68	65	68
11	Human nature cannot be changed since it is based upon instincts	D	55	45	50
12	All people reach physical maturity by the age of eighteen	D	10	10	8
14	All traits present in a child at birth are inherited traits	D	66	70	53
15	All traits appearing in a child after birth are the result of environmental influence	D	54	63	40
16	With the exception of identical twins, it is extremely unlikely that any two people have exactly the same heredity	B	29	35	28
17	Voodoism is in the blood of the negro	D	32	28	23
18	An English speaking person with German ancestors finds it easier to learn German than an English speaking person with French ancestors	D	32	25	25
19	If the tails are cut off of generation after generation of rats, there will eventually be born rats without tails	D	42	48	45
20	An average child of the cave-man of 10,000 years ago, if brought up in an American home of to-day, would in all probability become an ordinary American adult	B	65	55	63
21	Human progress is due to increased native intelligence from age to age	D	74	90	60
22	All men are born with equal powers	D	9	13	3
23	The average white man is born superior, intellectually, to the average man of any other race	D	65	78	55
24	Primitive people are born with keener senses than the more highly civilized	D	51	53	50
25	Men are, on the average, born superior intellectually to women	D.	37	45	38
26	People cannot be sharply differentiated into blondes and brunettes in many cases	B	11	13	8

No.	STATEMENT.	*KEY to attitudes which the writer takes as correct: B—Belief. D—Disbelief.	PERCENTAGE OF SUBJECTS INCORRECT. KEY*	All students 141	Lower group of students 40	Upper group of students 40
27	If we knew all about a person's heredity we could predict his success in the world	D	22	20	25
28	Any child, if carefully trained from birth, could be made into a successful doctor, lawyer, engineer or journalist	D	30	35	33
29	Geniuses are always succcssful, whatever the handicaps of their environment	D	21	23	15
30	Most great men have been born of poor but honest parents	D	43	48	35
31	On the average the strongest men physically are the weakest mentally	D	18	28	18
32	Homely women arc born with more intelligence than beautiful women	D	7	5	8
33	Brilliant children are more subject to brain fever than children of average or sub-normal intelligence	D	49	53	45
34	No defect of body or mind can hold us back if we have will-power enough	D	32	31	28
35	Faith alone can heal a broken leg	D	6	8	5
36	Intelligence plays a larger rôle in human happiness than does emotion	D	55	55	63
37	We are more likely to become fatigued from work that does not interest us than from work that does interest us	B	3	3	3
38	A person who is fatigued invariably does poorer work than the same person fully rested	D	92	98	95
39	Two individuals of the same intelligence will give almost identical testimony concerning an accident which they have both witnessed	D	26	25	23
40	All of man's actions are determined by his desire to seek pleasure and avoid pain	D	52	60	35
41	A man's character can bc read by noting the size and location of certain developments on his head	D	18	31	8
42	Certain lines on a person's hand are indicative of his future	D	20	25	15
43	People with long fingers are likely to be artistic	D	47	58	38
45	Red-headed people are likely to be temperamental	D	40	38	35
46	Large-mouthed people are likely to be generous	D	28	30	23
47	Green-eyed people are likely to be more jealous than blue-eyed people	D	16	20	10
48	Brunettes are more trustworthy than blondes	D	21	23	15
49	Cold hands are a sign of a warm heart	D	8	8	8
50	A person who holds his thumbs in his hands is a coward	D	7	5	8
51	A person may be a coward in one situation and not in another	B	6	5	5
52	Illegible handwriting is a sign of superior intelligence in the educated adult	D	7	8	5
53	If your ears burn it is a sign that someone is talking about you	D	4	0	8
54	It is unlucky to have anything to do with the number 13	D	1	3	5
55	Beginning an undertaking on Friday is almost sure to bring bad luck	D	4	5	3

IV.—Interpretation of results.

Interpretation of results must be undertaken by the writer and reader if they are to have much value. Nevertheless, it is well, as interpretations are made, to keep constantly in mind the fact that such inferences are more or less intellectually venturesome, and some of the reasons why this is so. Any statement of the test can, of course, have the same meaning to all of those concerned only to the extent that their pertinent experiences have been such as to give it that meaning. Furthermore, a statement which has the same proximate meaning for all may be rejected or accepted for widely different reasons by different individuals. Nor should it be overlooked that it is sometimes difficult to determine the relative importance of different beliefs since the influence on conduct of any one belief is modified more or less by other beliefs. The writer will attempt to keep his injunctions in mind as consideration is next given to the results thought to be of greater significance.

It is worthy of note that about one-fifth of the entire group of 141 subjects failed to reject a statement representing an assumption of astrology (1)[1]. Nor was there any difference on this item between the lack of success of the forty subjects ranking highest in general college achievement and that of the forty subjects ranking lowest.

Items 3 to 6 are concerned with the *relationship between man and other organisms*. Although the results reveal certain strengths and weaknesses on the part of the subjects, it is unfortunate that they do not indicate the extent to which the group had accepted the evolutionary nature of man's origin. The only statement bearing closely on the issue represents a fallacious, popular interpretation of the theory of evolution (3), and it is impossible to determine how many rejected the statement because they possessed a sound interpretation of the theory and how many rejected it because they entertained some opposing, traditional belief concerning man's origin.

Items 7-11 are devoted to the problem of the fixity of what current usage forces us to call '*human nature*'—although recognizing the frequent existence of fallacious assumptions in the uses to which the term is put. Considered together, the results on these items would seem to indicate that a rather large proportion of these subjects believed 'human nature' to be more fixed than do modern students of the problem.

The statements 14 to 17 were designed to reveal the prevalence of such concepts essential to an understanding of the nature of *heredity* as maturation (14, 15), and the infiniteness of possible hereditary combinations (16); also the extent of the acceptance of the popular belief in the "power of the blood as a conveyor of heredity influences" (17). The proportion of correct answers varied considerably from one item to another, but the high group was more successful than the low group on all of them.

The results obtained on items 18 to 21 considered together are thought to reveal widespread belief in the unproven doctrine of the inheritance of acquired characteristics. It is, of course, impossible to determine just how many in all assumed the fallacy in one or more of the specific situations. Nevertheless, it is to be especially noted that 90 per cent. of the low group and even 60 per cent. of the high group failed to reject the statement that human progress is due to increased innate intelligence from age to age (21).

Previously considered item 16 and items 22 to 26 are devoted to the problem of *individual differences*. Those who are concerned with the advancement of democratic ideals should note that, while only about one tenth of the entire group of subjects accepted the statement that all men are born with equal powers (22), two-thirds of them accepted the statement that the average white man is born superior intellectually to the average man of any other race (23), and one-third of them accepted the statement that men are, on the average, born superior intellectually to women (25).

The problem of the relationship between *hereditary and environmental influence* in the development of people is represented by items 27, 28, and 29. The extreme hereditarian dogma as represented by items 27 and 29 is subscribed to by about one-fifth of the subjects and the equally extreme opposing doctrine by a slightly greater number of subjects (28).

[1] Numbers in parentheses are numbers of test items in the table.

The results on items 24 and 30 to 33 are thought to reveal the influence of the outmoded doctrine of natural compensation in the thinking of the subjects—although it is difficult to tell just how many assumed the doctrine in accepting any one of the statements, since the statement may have been subscribed to as representing merely a specific and isolated belief.

Of the results on a *miscellaneous* group of items, those from 34 to 39, the results on the statement that no defect of body or mind can hold us back if we have will power enough are thought most significant, although only about one-third of the subjects failed on the item (34). This doctrine, bearing as it does on individual possibilities and responsibilities, has not in the past favoured the amelioration of the conditions of the unfortunate or the tempering of justice with mercy; it is doubtful if it does to-day. Nor should it be overlooked, in this connection, that about one-half of the subjects failed to reject a statement of the hedonistic philosophy as represented by an item not previously referred to—item 40. It should be noted, however, that the failure in the higher group was considerably less than in the lower on this last item.

The extent to which belief was entertained in various physical indices as revealers of traits of character and personality was tested by items 41 to 50. About one-fifth of the entire group of subjects accepted a statement representing the traditional belief in phrenology (41) and about as many a statement representing the traditional belief in palmistry (42), although the failure of the upper group was considerably less than that of the lower group on these two items. A much larger number believe that people with long fingers are likely to be artistic (43), and that red-headed people are likely to be temperamental (45). The failure was less, however, on the other items and very low on some (46-50). The failure of the upper group was less than that of the lower group on most of the items and in some of them considerably less. Nor should it be overlooked that the success on some related items, not previously referred to, was very high—items 51 through 56.

V.—SUMMARY AND CONCLUSIONS.

1.—The extent to which certain concepts and beliefs concerning human nature were prevalent in a group of senior pre-medical psychology students has been determined with some attempts at objectivity (*a*) for the entire group of 141 subjects, (*b*) for the group of forty ranking highest in college achievement, and (*c*) for the group of forty ranking lowest.

2.—A large number of surprising beliefs were discovered in the group.

3.—The failure of the low group was generally greater than that of the high group.

4.—Success varied greatly from one item to another—sometimes on closely related items.

5.—It would seem that any predictions concerning the prevalence of the various concepts and beliefs in the different groups based upon their known differences in general college achievement would not have been reliable.

THE DISTRIBUTION OF INTELLIGENCE AMONG UNIVERSITY AND COLLEGE STUDENTS.

By GODFREY H. THOMSON

(Moray House, University of Edinburgh).

I.—*The test.* II.—*The score distributions.* III.—*Overlap of categories.* IV.—*Scores made by sixteen-year-olds of known I.Q.* V.—*Formula for converting scores into I.Q.s.* VI.—*Intelligence distribution of students.* VII.—*Summary.*

I.—The test.

In Spring, 1943, a group intelligence test was given to all the students (mainly, of course, women) in training as teachers in Scotland. The test, made by Mr. W. G. Emmett, was like the Moray House Tests used for children of eleven or twelve, and those used for older children of fourteen or fifteen, but more difficult. Its hundred items were collected from the drafts of tests which are tried out for the purpose of eliminating easy, difficult, ambiguous, and non-discriminating items. These hundred items had been found much too difficult to be worth inclusion at those ages, yet discriminating. They were themselves the survivors of a larger number of such difficult items, after preliminary trials on adults. The test has not yet been published.

II.—The score distributions.

The distribution of scores obtained are shown in the following table. The forty honours graduates, and the 222 ordinary graduates, were all in their training year, having graduated in the summer of 1942 (two or three may have graduated earlier). Except for a very small number they were all women, the men being away in the armed services. Perhaps a score of the 262 were medically unfit men including two or three discharged after wounds.

The columns headed " non-grads " (non-graduates) show the scores of women students who come to the training colleges, with a leaving certificate, straight from school, and follow a three-year course. (Some, during a transition period which has been prolonged by the war, take their first year of training at their secondary school and only attend college for the final two years of the three-year course. Those training at schools were not tested.) Men students in Scotland must graduate before training (though this may have to be relaxed now) so that there are no men among these 739.

DISTRIBUTIONS.

Scores.	*Hon. Grads.*	*Ord. Grads.*	*Non-grads.* 1st.	*2nd.*	*3rd.*	*All.*	*All the preceding.*	*See Text.*	*P.T. (Wom.)*	*Dom. Science.*
95–100	2	3	1	—	—	1	6	—	—	—
90–94	7	12	3	—	6	9	28	10	1	5
85–89	3	29	7	9	12	28	60	29	6	9
80–84	8	24	14	16	23	53	85	34	6	15
75–79	3	31	14	20	30	64	98	39	13	20
70–74	6	29	18	22	29	69	104	40	6	27
65–69	2	26	27	36	38	101	129	50	14	35
60–64	6	25	25	27	45	97	128	39	8	37
55–59	1	13	43	20	36	99	113	39	19	50
50–54	1	17	32	27	29	88	106	28	14	46
45–49	—	6	23	15	23	61	67	35	13	30
40–44	1	2	11	11	19	41	44	19	8	23
35–39	—	2	9	6	4	19	21	7	1	15
30–34	—	2	2	2	2	6	8	5	1	3
25–29	—	—	2	1	—	3	3	4	—	4
20–24	—	—	—	—	—	—	—	—	—	2
15–19	—	1	—	—	—	—	1	—	—	1
	40	222	231	212	296	739	1001	378	110	322

THE SAME AS CUMULATIVE PERCENTAGES.

Below.	%	%	%	%	%	%	%	%	%	%
95	95	—	—	—	—	—	—	—	—	—
90	78	93	—	—	—	—	97	97	—	—
85	70	80	95	96	94	95	91	90	91	96
80	50	69	89	88	86	88	82	81	88	91
75	43	55	83	79	76	79	72	70	76	85
70	28	42	74	68	66	70	62	60	71	76
65	23	31	64	51	53	56	49	47	58	66
60	8	19	53	39	38	43	36	36	51	54
55	—	14	34	29	26	30	25	26	34	39
50	—	6	20	17	16	18	14	19	21	24
45	—	—	10	9	8	9	8	9	9	15
40	—	—	6	—	—	—	—	—	—	8
Upper Quartile	88	83	71	73	74	73	76	77	74	69
Median	80	73	59	64	64	63	65	66	60	59
Lower Quartile	67½	62½	52	53	54	53	55	54	52	50

Of the final three columns of the table, that headed " See text " is explained later. The penultimate column gives the scores of women students in training as specialists in physical exercises and hygiene in a separate college. The last column refers to those in training as specialists in the teaching of cookery, needlework, and the other domestic sciences.

III.—Overlap of categories.

The most immediately striking thing about these distributions is probably the overlap between the different categories of students. True, the honours graduates have the highest median score, and ordinary graduates the next highest. But numbers of the non-graduates and of the physical training and domestic science students have scores above the graduates' median, and many graduates, even some honours graduates, have scores below the non-graduates' median.

There was no particular incentive to the students to do well in the test, no tangible reward or threatened loss of any privilege, only the ordinary competitive spirit among human beings as individuals, as categories of students, and as colleges. I think these incentives were felt fairly strongly by most, but there is no doubt in my mind, from my wide experience of group testing among children, that a strongly competitive individual incentive, comparable with that which obtains in admission examinations to secondary schools in England, would have produced higher scores than those shown in our table, and it may be that individuals among the whole number did not try as hard as they might have done.[1] But this would affect all the different categories about equally, and cannot well be the explanation of the overlapping of scores between them.

IV.—Scores made by sixteen-year-olds of known I.Q.

It would be very interesting to know how these distributions compare with those of other samples of young adults, and particularly how they would compare with a random sample, that is, with the whole general population. Certain other categories of adults have been tested with this test, including some young soldiers, some clerks, and some engineering apprentices, and hints obtained towards the interpretation of scores in terms of intelligence quotient. The most reliable conversion, however, is through the scores of 378 secondary school pupils, of age-range 15½–16½, in an English town, whose distribution of scores in 1942 is given in our table in the column headed " See text." The I.Q.s of these 378 children were already known, for they had already been tested four times with other Moray House

[1] The very low score among the ordinary graduates was made by a returned soldier who was ill. It should really be excluded.

Tests, each of which had been standardised on a complete age-group of children. These four tests were given in October, 1936, March, 1937, July, 1937, and December, 1939, on which last occasion the test was one of our "Advanced" tests.

Some of the 378 children were absent on one or other of the five testing dates, but 316 were present every time. A comparison of their mean I.Q.s on the first four occasions with their raw scores on the adult test is as follows:

	I.Q.	*Raw Score on Adult Test.*
Mean	117·77	65·26
Standard deviation	9·87	14·86

r = ·792

V.—Formula for converting scores into I.Q.s.

From this a formula can be deduced for converting the Adult Test raw scores into intelligence quotients. If we use the major axis of the correlation ellipses for this purpose, as Otis recommends,[1] we obtain the formula

$$\frac{\text{I.Q.} - 117{\cdot}77}{9{\cdot}87} = \frac{\text{Score} - 65{\cdot}26}{14{\cdot}86}$$

i.e., $$\text{I.Q.} = {\cdot}664 \text{ score} + 74{\cdot}42. \qquad (1)$$

If we use the regression line, the right hand side of the first equation must be multiplied by the correlation coefficient ·792, giving then

$$\text{I.Q.} = {\cdot}526 \text{ score} + 83{\cdot}44. \qquad (2)$$

Actually, in 1942, an approximate formula, more convenient for the use of clerks, was used, viz.:

$$\text{I.Q.} = {\cdot}7 \text{ score} + 72 \text{ at age of } 16{\cdot}0 \qquad (3)$$

The three formulæ do not differ much over the range of I.Q.s in question, as can be seen from this table:

	Raw Score.	*Known I.Q.*	*Formulæ.*		
			(1)	(2)	(3)
Mean+σ	80·12	127·64	127·62	125·58	128·08
Mean	65·26	117·77	117·75	117·77	117·68
Mean−1σ	50·40	107·90	107·89	109·95	107·28

The first formula is most accurate, the second most cautious, the third most convenient, and probably as accurate as the experimental data justify.

VII—Intelligence distribution of students.

Before we apply this formula to the students in training it may be asked whether any difference in incentive existed between the testing of the sixteen-year-olds and the students. Probably not, for in the 1942 test there was no question of undue competition among the former, any more than among the latter in 1943. The test was given in both cases as part of an experiment, not as an important competitive event. We must also consider whether any age-allowance is needed, for the students were from one to five years older than the secondary school pupils, who were all between 15½ and 16½. A study was made of these latter grouped month by month, and an age-allowance of half a point of I.Q. per month was

[1] *Educational Psychology*, December, 1922, pp. 529-544.

actually made in 1939, from age 16·0. It seems, however, very unlikely that this will continue at older ages. There is only slight evidence of an age gradient over the three years of non-graduate students, and the mean score of all the 1,001 students (64·98) is identical with that of the 378 secondary school children (64·90). Finally, the formula

$$\text{I.Q.} = \cdot 7 \text{ score} + 70$$

was taken as a sufficiently good linear approximation to use for the students. Admittedly it is partly chosen for convenience of calculation. But it is probably as accurate as the evidence justifies, and, as far as age-allowance goes, it does not err in the direction of minimising their I.Q.s though it cannot give an I.Q. over 140.

On this formula, the intelligence quotients of the honours graduates, ordinary graduates and non-graduates are distributed thus :

	Honours Graduates.	*Ordinary Graduates.*	*Non-Graduates.*
Upper Quartile ..	131	128	121
Median	126	121	114
Lower Quartile ..	117	113	107

My thanks are due to the Directors and Principals of the Training Colleges, and their staffs, for administering and marking the test, and to the Executive Officer of the Scottish National Committee for the Training of Teachers, who suggested and facilitated this co-operation.

VII.—SUMMARY.

A difficult and unpublished group intelligence test was given in 1943 to all students in training as teachers in Scotland, namely 262 graduates taking a post-graduate training year, 739 non-graduates taking a three years' course, 110 and 322 taking courses as teachers of physical training and of domestic science respectively, 1,433 in all. The scores could be converted into I.Q.s owing to the fact that 378 sixteen-year-old secondary school pupils of known I.Q. had taken the test in 1942. The upper, median, and lower quartile I.Q.s were for honours graduates 131, 126, 117 ; for ordinary graduates 128, 121, 113 ; and for non-graduates taking a three-year course, 121, 114, 107.

THE RELIABILITY OF TEACHERS' ASSESSMENTS OF THEIR PUPILS.

By CYRIL BURT.

I.—*The distinction between reliability and validity.* II.—*Methods: the determination of reliability from a single test application.* III.—*Results: the reliability of school assessments.* IV.—*Reliability determined by analysis of variance.* V.—*Summary.* VI.—*Appendix: proof of formulæ.*

I.—The distinction between reliability and validity.

In organizing schemes for post-war education, one of the most difficult problems will be to decide what particular type of secondary education is most suitable for this or that particular pupil. How is such suitability to be determined? From the White Paper and other reports it would appear that chief reliance is to be placed on teachers' " assessments of their pupils' individual aptitudes," even in preference to tests and examinations. Among the more progressive educational authorities, however, there is a widespread feeling that sufficient knowledge is not yet available for the best methods to be laid down forthwith by official regulation, and that a good deal of preliminary investigation is required; some even seem disposed to make use of the powers granted by the Act to " conduct or assist in conducting researches " upon this, as well as upon other, educational problems. Three fundamental questions call for urgent inquiry: (1) What value is to be attached to the different methods of assessing abilities or aptitudes? But, before we can answer this, we need to know (2) how can that value be estimated or measured? And then, having estimated it, we shall also want to know (3) how such methods can be improved?

In considering the relative value of different modes of assessment two points are commonly confused, namely, what might be termed the *accuracy* and the *appropriateness* of the methods proposed. A popular argument, put forward again and again by teachers and others who express opinions on the subject, runs briefly as follows: Surely the personal knowledge, acquired by a teacher who has worked for several terms and possibly for several years with his pupils, must be far more trustworthy than anything that can be learnt from a test, an examination, or an oral interview, which is carried out on a single day, lasts only for an hour or two, and of necessity deals only with limited samples of the pupil's work. In reply the scholarship examiner or the testing psychologist will generally point out that at any rate the results of two or more such examinations or tests nearly always show a fairly close agreement, whereas the assessments of two equally competent teachers often differ very widely; and, if they differ, both cannot be correct. We are thus faced with an apparent dilemma: either we can mark the wrong things with much consistency and precision, or we can try to assess the right things at the risk of much inaccuracy and inconsistency. Which course are we to prefer?

Before we can decide which methods are the best, it is obvious that we must first ascertain, for every procedure, the amount of depreciation arising from these two causes. The closeness with which a test (or other assessment) measures the quality it was meant to measure is technically termed its ' validity '; the closeness with which two independent sets of test-measurements agree with each other is usually described as their ' reliability ' (' self-consistency,' ' accuracy ' or even the old statistical term ' precision ' would be more intelligible and less ambiguous; but Spearman's label has stuck). With this distinction in mind the truth about teachers' assessments can be summed up as follows: An observant teacher very possibly may reach a sounder notion of the true qualities of his pupils than any passing test or outside examiner; but his statement of those qualities may be so overlaid with personal or accidental errors that in practice the results of his observations is often vitiated or obscured. Thus, the higher ' validity ' of one teacher's assessments may be largely nullified by their low ' reliability.' Moreover, the amount of this overlying error or ' unreliability ' probably varies very widely for different mental qualities, as it does for different mental tests. Hence, it is of paramount importance to determine for which particular abilities or character-traits a teacher's assessments are most reliable

and for which a standardised test or examination yields more reliable data. Until we have demonstrated that a given test or other method of assessment will furnish figures that are stable and consistent, there is no use in asking whether the ability those figures are actually measuring is really the ability with which we are concerned.

II.—METHODS : THE DETERMINATION OF RELIABILITY FROM A SINGLE TEST APPLICATION.

Reliability Measured by Correlation.—In the early days of psychological testing, it was a rule to repeat all tests and all assessments, and so obtain two sets of measurements for every trait or ability tested or assessed. The correlation between two such sets was termed by Spearman a ' reliability coefficient,' and was taken to indicate the degree to which the measurements had been freed from disturbing influences.

To this procedure there are theoretical as well as practical objections, though neither are insuperable. First, a low correlation between two successive tests may indicate either an instability due to the test or an instability in the function tested. As Spearman's work was mainly concerned with assessing what we now call ' innate intelligence,' he was quite right in regarding *both* these sources of inconsistency as a defect in any test he was using. But for more general purposes it seems essential to keep the two things apart. Accordingly, I proposed to distinguish between what I called ' consistency coefficients for tests ' and ' consistency coefficients for persons ' (i.e., for the mental abilities or attainments tested).[1] Here we shall be concerned solely with the consistency of tests (or of teachers' assessments or examinations). In this sense reliability depends simply on freedom from errors of measurement. Lapse of time has nothing to do with it. Hence, to estimate it, two successive testings are by no means necessary.

But there is another objection. In practice it is often exceedingly difficult, if not impossible, to collect all the examinees on a second occasion and to spend the time and trouble necessary for repeating the whole test or the whole examination, or to find a second person, equally competent, who knows them equally well, and will carry out an independent assessment. And I suspect that it is chiefly because of the practical difficulties attending the old method of measuring reliability that this custom has of late been largely dropped.

Reliability Measurable by Factor-Analysis or Variance-Analysis.—It is the object of this paper to urge that such efforts should be revived, and to suggest a simpler, and in my view more scientific, procedure for estimating reliability by means of data that can often be obtained with a single test-application only. The fundamental principle is that which I endeavoured to lay down in dealing with the reliability of examination marks,[2] namely, to regard the empirical mark as " the sum of two independent factors, the ' true ' value of the mark (which we can regard as a ' general factor ') and the ' error of measurement '." Our aim will then be to express the total variance (that is, the total amount of variation displayed by the individuals measured) as the sum of two contributory portions, corresponding to these two factors.

A word may be added to explain the technical meaning of ' variance,' which is now so widely used to measure the amount of individual variability of a group. In a recent scholarship examination the marks obtained for English by the brightest, average and dullest girls and boys from a particular school were (in round figures) (*a*) girls, 60, 50, 40; (*b*) boys, 60, 40, 20. The variations of the six individuals from the general mean for their sex were, therefore +10, 0, −10, and +20, 0, −20 respectively. To calculate the *average* variation shown by the boys and the girls, respectively, we should disregard signs, add up the deviations,

[1] This is a special instance of the now familiar contrast between ' correlating tests ' and ' correlating persons ': (cf. BURT, *Eugenics Review*, XXX, pp. 258-9; THOULESS, " Test Unreliability and Function Fluctuation," *British Journal of Psychology*, XXV, pp. 325-343).

[2] HARTOG, RHODES and BURT, *Marks of Examiners* (1936), Memorandum I, pp. 274, *et seq.* At the time this memorandum was written my suggestions were criticised on two grounds: First, it was said, they involved the assumption that persons could be correlated as well as tests and the correlations obtained factorised by the methods ordinarily applied to test-correlations; secondly, they assumed that the analysis of variance could be applied to data obtained from mental measurement as if those data were just as objective as data obtained from physical measurement. I believe that these assumptions would no longer be questioned by other psychologists, since both procedures have since been employed by numerous investigators alike in this country and in America. At the same time, I should be the last to deny that such criticisms contain an important element of truth and imply the need for special caution.

and divide by the number of measurements (the method adopted by every pupil in the geography lesson when he is required to show that the temperature of London is more variable and that of Madeira more equable). We obtain, for the average variability of the girls, $6\frac{2}{3}$, for the boys $13\frac{1}{3}$. But simply to disregard the signs is a very rough and ready expedient; the orthodox way to abolish plus and minus signs is to *square* the deviations; this is the method adopted in calculating the root-mean-square variation or 'standard deviation' (σ). Applying the same procedure to average the *squared* deviations we now obtain, for the girls, $\sigma^2=(10^2+0^2+10^2)\div 3=66\cdot\dot{6}$, and for the boys $(20^2+0^2+20^2)\div 3=266\cdot\dot{6}$. Had we based this calculation on the marks for *all* the candidates instead of only three, we should consequently have demonstrated that, though the mean mark for the girls is larger than that of the boys, their *individual variability* or 'variance,' like their range, is smaller. Thus computed, the variance is the mean square deviation, i.e., the simple *average of the square-sum*. The special advantage of taking the 'variance' as the best measure is that, unlike the range, it is based on the marks obtained by *all* the individuals measured; and unlike the mean variation or standard deviation (the square-root of the variance) it can be *added and subtracted*. As a consequence we can 'analyse' the variance into its components. With suitable data, for example, we can show that the total variance of the raw marks (σ_t^2) is the sum of (i) the variance of the true marks *plus* (ii) a remainder which is due to errors of measurement; or, in a simple formula, $\sigma_t^2=\sigma_g^2+\sigma_e^2$.[1] In passing may I repeat what I have urged in previous articles, and remind those who may be contemplating research on educational problems that what Fisher and others have shown holds good of agricultural and biological investigation is to a large extent true of psychological investigation: "Problems which in the past have been dealt with almost exclusively by calculating correlations can be attacked far more simply and successfully by an analysis of variance."

This mode of analysis has a twofold value—theoretical and practical. For theoretical purposes the simple equations quoted from my Memorandum (see footnote) lead at once to convenient definitions of 'reliability' and 'unreliability'; unreliability will be measured by "the ratio of the residual variance to the total variance" (*Memorandum*, p. 278), that is, by the proportion of the total variance that is attributable to influences other than the true values, or, in one word, to *error*; similarly, 'reliability' will be measured by the proportion of the total variance that is attributable to the *true* values.

For practical purposes the equations further imply that we can estimate reliability by two alternative procedures, either by factor-analysis or by analysis of variance. In either case, with tests or examinations of the ordinary type, the 'reliability' can be determined from a single test-application only; where subjective judgments are involved—e.g., where examiners award marks to scripts on the basis of general impressions, or where teachers assess mental or moral qualities by a single impressionistic mark—two or more independent assessments may still be desirable.

Of the two procedures thus available, I hold that, in general, the method of factor-analysis leads to more accurate estimations, but that the variance-method, which is much simpler and speedier, is sufficiently exact for most ordinary work. The factorial approach takes as the best estimate of the 'true marks' a ***weighted*** average (or sum) of the actual marks, and thus entails

[1] The relations between variance as thus analysed and the more familiar measures of consistency or 'reliability' are given by the following equations. Thus, if r_{jg} denotes the correlation between the empirical marks (j) and the true values (g), then what is called the 'index of reliability' will be

$$r_{jg}=\sqrt{\frac{\sigma_g^2}{\sigma g^2+\sigma_e^2}}$$

Further, if j and j' denote the empirical marks obtained on two precisely equivalent occasions ('equivalent' meaning that proportionate disturbance due to error is of equal amount in both), then, by what I term the product theorem, the 'coefficient of reliability' will be

$$r_{jj'}=r_{jg}\,r_{j'g}=\frac{\sigma_g^2}{\sigma_g^2+\sigma_e^2}$$

What may be called the 'index of unreliability' is similarly given by

$$\sqrt{1-r_{jj'}}=\sqrt{\frac{\sigma_e^2}{\sigma_g^2+\sigma_e^2}}\quad (\textit{Memorandum}, \text{ eq. xii, xvii}).$$

a more laborious calculation. The alternative approach takes instead the ordinary *unweighted* average (or sum), and assumes that the standard deviations of the several examiners do not differ significantly; and then, by the usual procedure for analysing variance, it inquires to what extent the differences between the average (or total) marks secured by the individual pupils are significant. For those who are interested in estimating the reliability of their assessments or tests (as, indeed, all teachers should be) I shall briefly illustrate the simplicity of the newer methods in the closing sections of this paper; it will be seen that they require only the most elementary knowledge of arithmetic and algebraic symbols. The general reader, however, will probably prefer first of all to learn what kind of practical conclusions can be reached by this means.

III.—RESULTS: THE RELIABILITY OF SCHOOL ASSESSMENTS.

Provisional Results.—To obtain some provisional answer to the practical problem indicated at the outset, I have calculated, by one or other of the methods described below, 'reliability coefficients' for all the relevant data that I have to hand for children of about 10½ to 11½ years (Table I). In planning our various surveys of the distribution of intelligence, school attainments, backwardness and scholarship ability among the London school population, it has not always been practicable to try out every test with two applications

TABLE I.
RELIABILITY OF TESTS AND TEACHERS' ASSESSMENTS.

Trait Assessed.	*Method of Testing.*	*Reliability of Test.*	*Reliability of Teacher's Assessment.*
General Intelligence	(*a*) Terman-Binet	·92	·73
	(*b*) Northumberland Group Tests	·94	
Composition	Test 20	·78	·84
Reading	(*a*) Test 1	·81	·86
	(*b*) Test 5	·79	
Spelling	Test 6	·82	·91
Arithmetic	(*a*) Test 9	·88	·95
	(*b*) Test 10	·85	
Drawing	Test 17	·76	·60
Handwork	Test 19	·71	·47
Verbal Ability	Factor-Analysis	·73	·51
Numerical Ability	Factor-Analysis	·82	·58
Manual Ability	Factor-Analysis	·69	·42
General Culture	General Knowledge Paper	·77	·68
Emotional Stability	(*a*) Questionnaire	·66	·72
	(*b*) Interview	·61	
Industry	Observation during Tests	·58	·89
Neurotic Tendencies	(*a*) Various tests	·46	·42
	(*b*) Interview	·69	
Delinquent Tendencies	(*a*) Various tests	·36	·66
	(*b*) Interview	·48	

first of all; but where two applications have been made, I find that in almost every case the reliability coefficients calculated by the ordinary correlational procedure agree quite closely with those calculated by variance-analysis. Accordingly, in the present case at any rate, it seems justifiable to treat coefficients calculated by the latter method as comparable with those obtained by the former.

The tests of educational attainments are described in *Mental and Scholastic Tests* (pp. 269f.), and the tests for stability, neurotic tendencies, and delinquent tendencies in *The Subnormal Mind* (pp. 326 f.) and *The Young Delinquent* (pp. 405 f.). The groups were usually complete age-groups; where selection was suspected, the correlations have been reduced to terms of a standard age-group having a standard deviation on the London revision of the Binet Scale of 15 I.Q. The smallest group consisted of about fifty to sixty pupils of either sex; and the figures from the groups in different schools or departments have been averaged. Thus the coefficients printed in the table are based on 100 to 200 cases. For the smallest of the total groups and the lowest coefficients the probable error of the difference would accordingly be about $\pm 0{\cdot}033$. Hence any difference over 0·10 is fully significant; and in most cases the just significant difference is much smaller.

From these various figures several generalisations seem to emerge:

(i) For mental characteristics, about which they are constantly thinking during the everyday work of the classroom (e.g., industry, or attainments in the three R's), the assessments of competent teachers appear to be quite 'reliable'—indeed, more 'reliable' than those of standardised tests, though in the case of attainments there is little to choose.
(ii) In assessing intelligence (i.e., innate general intellectual ability) teachers' are decidedly less reliable than psychological tests.
(iii) In assessing special abilities they are even less reliable.
(iv) In assessing most character-qualities their reliability, though never very high (except for industry), is higher than that of a psychologist depending on a single interview or than any psychological tests at present in use.
(v) In assessing neurotic tendencies teachers' judgments are apt to be decidedly unreliable.

Improving Reliability.—If we could assume that the chief source of unreliability consisted of random errors, uncorrelated for different assessors, then in theory the simplest way to increase reliability would be to increase the number of judges. For example, from Table I we see that the reliability of *one* teacher's assessment of 'special abilities' (numerical, verbal or manual) is about 0·50. From the equation given below we can calculate that, in order to raise the reliability to 0·80, we should need to average assessments from *at least* four independent teachers. As can be seen from the formula, increasing the number of judges beyond four or five will yield only a diminishing amount of improvement, particularly when the amount of reliability displayed by a single judge is already fairly high.

However, in ordinary circumstances the estimates of four or five teachers, all judging the same group, would probably be influenced by sources of error that were by no means uncorrelated. In discussing tests, Guilford, for example, enumerates twenty-two possible causes of unreliability.[1] Yet it is doubtful whether all have the same influence in actual practice. Using the procedures described above, it is a simple matter to compute what improvement in reliability is achieved when special precautions are adopted with a view to eliminating or reducing one or other source of error. From the results obtained it is clear that the more obvious causes are not always the most important. Thus, the length of time during which the teacher has known his pupils, and the length of experience he has enjoyed as a teacher, appear to have far less influence than is commonly supposed. On the other hand, a little systematic practice in making such assessments, especially where they can subsequently be verified or checked, proves to be of very great value. The following are the more definite suggestions which, as a rule, seem to yield the most marked improvement.

[1] *Psychometric Methods*, pp. 417-8. Every teacher should read Vernon's admirable discussion in *The Measurement of Abilities*, pp. 224f. and 284f.

(i) The traits to be assessed should be, so far as possible, mental abilities or character-traits, recognised in psychological research, not the vague entities or abstract nouns of popular description, which often designate an obscure compound of several traits varying more or less independently of one another. Each trait should be explicitly and unambiguously defined; and the different grades of it illustrated by brief concrete descriptions.

(ii) So far as possible, the assessments should be based on a review of actual performances and observable behaviour rather than on subjective impressions. Hence the more important manifestations or symptoms of the trait should be enumerated in concrete (not abstract) terms.

(iii) The activities observed should be as numerous, as objective, and as distinct as possible. The sub-division of a trait into a number of sub-traits or a variety of manifestations, each to be rated separately, usually increases the reliability of the average resultant, much as does the averaging of judgments from a number of separate assessors. In rating measurable qualities, such as intelligence or attainments, the assessments should be based on actual tests or examinations.

(iv) Irrelevant influences that require to be discounted should be explicitly stated. Thus, in assessing intelligence by school performances, teachers are apt to forget the part played by industry and interest; and in assessing special abilities teachers are apt to include the influence of general intelligence. In particular, the assessor should be warned about the effect of 'halo' (the unconscious tendency to infer that a particular person must be good in all qualities because he is good or likeable in one).

(v) The assessments should be expressed in terms of a simple numerical or literal scale, with the prescribed frequencies for each numerical or literal mark. Marks should be thought of as relative measurements, not absolute measurements. Thus, a mental ranking of the individual pupils in order of merit, beginning from both ends and working towards the middle, is of great assistance. Those individuals falling towards either extreme on the scale should be well spaced out; and mediocre cases freely bracketed. The use of a graphic rating-scale does not appear to improve the reliability of teachers' assessments so much as might be expected.

(vi) Common sources of unreliability are lack of interest and lack of time. Hence everything should be done to stimulate the assessor's keenness and to allow sufficient time for reflection. This means that a single teacher should not be asked to rate too many pupils or too many different qualities.

(vii) When several assessors mark the same pupils for the same qualities, each should decide on, and write down, his own independent assessments before consulting the others.

Before deciding to which type of post-primary school a pupil at the transition-stage should preferably be sent, there are no doubt other aptitudes and character-traits, besides those enumerated in Table I, which should be taken into account. How far they can be reliably assessed by teachers is, I believe, at present almost wholly unknown. Hence there would seem to be an urgent need for further research on the whole problem of reliability; and it is hoped that the methods advocated here, being extremely simple in the type of data required and the mode of computation entailed, will be of service to teachers and others who desire to assist by carrying out such investigations.

IV.—RELIABILITY DETERMINED BY ANALYSIS OF VARIANCE.

(i) *Reliability of Personal Judgments.*—To illustrate the simplicity of the calculations entailed by the method proposed, and the closeness with which the results agree with those of the more laborious procedure, may I take the example used in the Memorandum already cited?

The Latin scripts of fifteen pupils who sat for the School Certificate Examination were marked by six examiners (*loc. cit.*, table 12, p 20). The problem was to determine the 'reliability' of the marking, which was here based on the impressionistic judgments of the examiners, and not on the more objective method of counting up correct replies. If we estimate the 'true marks' by the best-weighted sum (determining this in turn by a factor-analysis carried out by 'weighted summation') the correlation between the total marks and the 'true marks' proves to be $r_{j\bar{g}}=0{\cdot}975$. This is the 'index of reliability' for the whole Board; the 'coefficient of reliability' is, therefore, $r_{jj}=r_{j\bar{g}}^2=0{\cdot}951$ (*loc. cit.*, p. 303).

By way of comparison, let us now set out in full the results of 'analysing the variance' in accordance with the tabular scheme described in nearly every modern textbook on statistics.[1] This scheme would enable us to determine both (i) whether the average marks for the candidates differ significantly (i.e., are in any degree 'reliable') and (ii) whether the standards of severity adopted by the various examiners differ significantly. Here we are concerned with the former problem only.

TABLE II.

SCHOOL CERTIFICATE LATIN: ANALYSIS OF VARIANCE FOR MARKS.

Source of Variation	*Number.*	*Degrees of Freedom*	*Sum of Squares.*	*Mean Square.*	*Standard Deviation.*
Examiners	6	5	1315·2(=T)	263·04(=$\overline{T}$)	16·22
Pupils	15	14	1223·7(=P)	87·41(=$\overline{P}$)	9·35
Error.....	90	70	341·6(=E)	4·88(=$\overline{E}$)	2·21
TOTAL	90	89	2880·5(=S)		

If there were no significant differences between the pupils' marks, i.e., if the differences were purely random, the standard deviation for pupils would in the long run be identical with the standard deviation for random variation or 'error.' Fisher's method of testing significance is therefore to take the ratio of these standard deviations, find the natural logarithm of that ratio, and compare it with the borderline figures set out in his table. It is somewhat quicker to use the ratio of the mean squares as they stand, viz.,

$$F_p = \frac{\overline{P}}{\overline{E}} = \frac{87{\cdot}41}{4{\cdot}88} = 7{\cdot}9.$$

Snedecor tabulates borderline values for these 'critical ratios' instead. With fifteen pupils and six examiners (and therefore 14 degrees of freedom for pupils and 70 for error) the 1 per cent. borderline is only 2·35. Accordingly there is no question that the differences are fully significant.

It remains to determine how significant these differences are. By the formula given above the 'reliability coefficient' is

$$r_{tt'} = \frac{\sigma_e^2}{\sigma_g^2 + \sigma_e^2} = \frac{\overline{P} - \overline{E}}{\overline{P}} = \frac{87{\cdot}41 - 4{\cdot}88}{87{\cdot}41} = 0{\cdot}944.$$

In practice it is unnecessary to make the detailed tabulation I have given here. *We need only calculate the sums of the squares, and then use equation vi* (cf. Appendix below); this necessarily gives the same figure as before, viz.,

$$r_{tt'} = \frac{n}{n-1}\left(1 - \frac{S - T}{nP}\right) = \frac{6}{5}\left\{1 - \frac{2880{\cdot}5 - 1315{\cdot}2}{6 \times 1223{\cdot}7}\right\} = 0{\cdot}944$$

The 'index of reliability' is, therefore, $r_{tt'} = \sqrt{0{\cdot}944} = 0{\cdot}972$.

I have chosen this set of marks to illustrate my argument, because in this case it is possible to calculate a 'reliability coefficient' by the ordinary correlational procedure. As it happens the same set of scripts was also given to a second Board of Examiners to mark. (The second Board included seven examiners instead of six; and to prevent this increase in their number increasing their 'index of reliability,' I have omitted the last examiner, 'G'). On calculating the correlation between the two sets of total marks, we obtain a coefficient of 0·950. This agrees very closely with the coefficients we have just obtained from *one* Board only—most closely with the figure obtained by factor-analysis: (to three decimal places the agreement is exact, but this coincidence is of course accidental).

[1] E.g., YULE AND KENDALL, *Introduction to Statistics*, p. 448, Table 23.4. For the present purpose the ordinary teacher will find the working method described in Snedecor somewhat easier to follow (*Statistical Methods*, p. 216, Table 11.3); or he may refer to my roneo'd *Laboratory Notes* (obtainable from the Psychological Department) on "Reliability Determined by Analysis of Variance," where the above example is worked out in full.

The reader may inquire what is the algebraic connection between the formulæ deduced from the principles of correlational analysis and from those of variance-analysis respectively. I have endeavoured to demonstrate the general relations elsewhere in discussing the principles of factor-analysis (*Factors of the Mind*, p. 275). The essential equation connecting the two was given in the Memorandum already cited (p. 303). We have, in fact,

$$r_{\bar{j}g} = \sqrt{r_{tt'}} = \frac{n\bar{r}_{jg}}{\sqrt{n + n(n-1)\bar{r}_{jj'}}} = \sqrt{\frac{n\bar{r}_{jj'}}{1 + (n-1)\bar{r}_{jj'}}}$$

This gives (according to the calculation set out in that Memorandum) $r_{\bar{j}g} = 0{\cdot}975$ and $r_{tt'} = 0{\cdot}950$; and we see that the various formulæ "give the same figures to the third decimal place."

The equation just cited indicates how many assessments would have be to averaged to bring the reliability up to whatever figure was deemed desirable. We have in fact (*loc. cit.* eq.xli).

$$n = \frac{r_{\bar{k}g}^2(1 - \bar{r}_{kk'})}{\bar{r}_{kk'}(1 - r_{\bar{k}g}^2)} = \frac{r_{tt'}(1 - \bar{r}_{kk'})}{\bar{r}_{kk'}(1 - r_{tt'})}$$

In the instance already taken, the index of reliability for single examiners varied from 0·721 to 0·950 (average, 0·871) and the coefficient of reliability therefore from 0·520 to 0·903 (average 0·672). With a board of six examiners, as we have seen, the index rose to 0·975 and the coefficient to 0·951. To raise the coefficient to 0·990 we find from the formula just given that a board of over seventy examiners would be necessary, all examiners marking the scripts independently and so neutralizing each other's errors.

(ii) *Reliability of Tests.* (a) *Graded Tests.*—Instead of combining the marks of six examiners all marking the same scripts, or it may be the gradings given by six teachers all assessing the same quality in their pupils, the psychologist very commonly proceeds by combining measurements obtained from six or more standardised sub-tests included in the same booklet. In such a case the problem is complicated by the fact that the several sub-tests may not be strictly 'equivalent' in the sense above defined: indeed, they may have been intentionally designed to measure the same quality as it reveals itself through different media, and thus chosen for low rather than for high inter-correlations. In practice, however, this entails no serious difficulty; and the essential procedure and formulæ remain the same as before.[1]

(b) *Pass-or-Fail Tests.*—Again, instead of combining marks from half-a-dozen sub-tests in the same booklet, we may require to combine marks from thirty or more questions or 'items' making up a single composite test. This is the principle involved in measuring intelligence by the Binet scale. In such cases the determination of reliability, as defined above, becomes part of the problem of 'item-analysis' and 'item-synthesis' (to coin a useful phrase). As a rule, it seems to be supposed that we can only reach a fair estimate of reliability when *two* forms of the test are available, such as the L- and M- forms of the latest Terman-Merrill revision. In these last two forms, however, many of the items have a low validity for London children; and, on revising the scale for use in this country, we have had to amalgamate the best items taken from each into a single version. Once again, therefore, we are compelled to determine reliability from one application of the test only. Nevertheless, by using the variance of the component items to estimate the error variance, we can still deduce what I have termed a 'consistency coefficient' to measure the reliability of the scale as a whole.[2]

In the Binet scale, as in many of the ordinary class-tests and examinations ordinarily carried out by teachers, the marks are no longer graded variables: the examiner merely counts up the number of questions correctly answered, i.e., in effect he gives 1 mark for each 'pass' and 0 for each 'failure.' The basic formulæ are consequently those appropriate to what Yule

[1] A study of formulæ xv and xvi yields several practical corollaries for test-construction: e.g., the reliability of a graded test will tend to be much higher than that of a uniform test when both are of equal length; and reliability is greatest where about half the examinees can answer each question correctly.

[2] Cf. my preliminary report on "The Latest Revision of the Binet Tests," *Eugenics Review*, XXX (1939), pp. 255-260. (The analysis of variance had also been used by Miss John and myself in estimating the reliability of the older form of the Terman-Binet scale: cf. this *Journal*, XII, p. 117f.).

has termed the 'sampling of attributes' instead of to the 'sampling of variables.' In such a case the variance for each item can be directly determined from the number of pupils answering it correctly; and, as a result, the 'analysis of variance' leads to formulæ which are simpler still (cf. Appendix, equation xiv).

These, then, are the simple formulæ which I venture to recommend to teachers in estimating the reliability of their own examinations where the marking is of the type described and a repetition of the examination is out of the question.

Alternative Approaches.—As every textbook on psychological and educational measurement points out, there are three rival procedures for determining reliability by means of correlation—repetition of tests, parallel forms, and split-half; and each, we are told, "involves different assumptions and gives different results."[1] In view of these and other drastic criticisms there can be little wonder that educationists have largely abandoned the attempt. The teacher will therefore naturally inquire how far the procedure here proposed meets the objections previously raised.

Of the discussions on reliability that have appeared since the publication of the memorandum drawn up for the International Institute Examinations Inquiry, probably the most important is that of Kuder and Richardson.[2] Their formulæ have been widely used in America (particularly in educational psychology and in personnel selection in the Army) and still more widely criticised. Their equations are deduced from a rather formidable and speculative set of assumptions. Like most other writers, they start from Spearman's conception of reliability, and state that "the reliability coefficient is defined as the correlation between one experimental form of a test and a hypothetically equivalent form." Two tests (or two forms of a test) are defined as 'equivalent,' when corresponding items in either test (i) have the same difficulty; (ii) have the same correlation with each other as they have with themselves (i.e., a correlation equal to their own reliabilities); (iii) have the same correlations with all other corresponding items; and (iv) are in fact generally interchangeable. The writers then assume that the matrix of inter-item correlations should be (at any rate in theory) a perfect hierarchy, i.e., a 'matrix of rank one'; and that for practical purposes all the inter-item correlations may be taken as approximately equal to the average item self-correlations or 'reliabilities' and therefore approximately the same; and finally that their standard deviations are approximately equal. On this basis they reach a series of equations, several of which are similar to those given in my previous memoranda.

The assumptions which they lay down, however, have been forcibly criticised by Kelley,[3] Ferguson,[4] and other writers. The critics argue, and I think with justice, that very few tests could be expected to conform to such complicated conditions, and consequently, so far as the formulæ depend on these conditions, "their value as measures of reliability will be seriously impaired." Kelley regards their final form as "utterly suspect," and seems disposed to reject the proposals altogether; Ferguson suggests invoking an alternative postulate, namely, that the "average inter-item covariance" may be taken as equal to what may be called the "average item self-covariance" (i.e., the average of the reliability of each item multiplied by its variance). But it would be almost as difficult to demonstrate for any given test that the component items obey this alternative requirement as to prove that they conform to those laid down by Kuder and Richardson.[5]

[1] GUILFORD, *Psychometric Methods*, p. 411.

[2] *Psychometrika*, II (1937), pp. 150-160. Cf. *J. Educ. Psych.*, XXX (1930).

[3] *Psychometrika*, VII (1942), p. 81.

[4] *The Reliability of Mental Tests* (1940), p. 31.

[5] Ferguson appears to assume (p. 29) that the inter-item correlations can be calculated by the so called phi-coefficient (i.e., the product-moment correlation between two point distributions or root-mean-square contingency: I presume that is the coefficient intended by his equation 25, *loc. cit.*, p. 29). But this is surely a case where the tetrachoric coefficient should be employed, since the ability underlying the answers of test-questions can scarcely obey a point distribution. The computation of tetrachorics is supposed to be laborious; but if one uses a graph for 'normalised' or 'equalised phi' (*Mental and Scholastic Tests*, p. 27), one can then correct either by a trigonometrical formula or by a second graph (*Psychometrika*, IX, p. 223).

The inappropriateness of Ferguson's method of calculating item-correlations seems revealed in another contribution published by him about the same time ("The Factorial Interpretation of Test Difficulty," *Psychometrika*, VI, 1941, pp. 323-9), where he shows that the introduction of differences of difficulty into tests which are otherwise homogeneous seems simultaneously to introduce a new factor: The alleged factor disappears if tetrachoric correlation is employed. For the rest, in regard to the 'general concept of reliability,' Ferguson's conclusions appear to be much the same as my own, namely, that at bottom "the reliability coefficient is," as he puts it, "a simple function of the variance of the distribution of errors": (cf. *loc. cit.*, pp. 9-10, where his equation expressing this function is, except for notation, identical with equations xii and xvii of my Memorandum).

If, however, we are willing to assume that the test-items fulfil the more general and more usual conditions required by the analysis of variance, then (as I have endeavoured to show) we are led to a more general equation, of which the Kuder-Richardson equations appear to be special cases; indeed, except for slight differences of notation, the former reduces directly with the latter, when we have the further information that the marks take only the values 0 or 1.

Dr. Stephenson, however, would even doubt whether the conditions I myself am accepting can be safely assumed in psychological inquiries. Discussing my original proposal to adopt the method of variance-analysis for estimating reliability, he has declared that " analysis of variance, as developed by Fisher and Snedecor, is inapplicable to psychological measurements," for " variance in psychology depends for its magnitude merely on the psychologist's whim."[1] In reply, I would say that, although some of the differences in variances may undoubtedly be " merely subjective " (and I readily admit the importance of recognising the limitations this imposes), nevertheless, with proper experimental conditions, the ratios between mean-variances and error-variances can be rendered almost as " objective " as they are in other sciences. But here perhaps the most convincing answer is an appeal to actual results. At my suggestion, therefore, Miss Cast, Miss Harwood and other research workers have been good enough to carry out several intensive studies with marks obtained from school teachers and university examiners, in which the reliability of the data was determined both by factor-analysis and by analysis of variance. The values obtained appear to provide strong prima facie evidence for the practicability and trustworthiness of the variance procedure.[2]

From these and other investigations, and largely for the reasons set out in the memorandum already quoted, I conclude[3] (i) that the ideal procedure is to employ a factor-analysis based on " correlations between persons," but (ii) that, for most practical purposes, almost equally trustworthy results may be obtained by the much simpler method of analysing variance, and (iii) that the results of both are comparable with those given by the ordinary ' coefficient of reliability,' based on two equivalent modes of assessment, when due precautions are observed. Two special advantages of analysing variance are, first, that it leads to a much clearer interpretation of what the coefficients and indices of reliability really measure, and, secondly, that it is applicable to the numerous cases in which a test can be applied only once.

V.—SUMMARY.

1.—' Reliability ' is primarily to be conceived as the ratio of the true variance to the total variance—that is, in simple terms, as freedom from error—rather than as the amount of agreement between two successive tests or assessments, which might more appropriately be termed ' consistency.' When adequate conditions are preserved, the two modes of measurement tend to be identical.

[1] *Psychometrika*, IX (1939), p. 277.

[2] Miss Cast's investigation dealt with various methods of marking pupils' essays, and an abridged account of her thesis was eventually published in this *Journal*, IX (1939), pp. 264-9. In their latest investigation of this problem, the International Institute Examinations Inquiry Committee have adopted the same double procedure for the same problem. (*The Marking of English Essays*, 1941, pp. 39-54, 150). Miss Harwood's work, undertaken about the same time, dealt with the reliability of the marking for the Teacher's Certificate and the Teacher's Diploma Examinations. A somewhat similar approach has been followed by Mr. R. W. B. Jackson. He, however, prefers to substitute " a new concept, the ' sensitivity ' of the test, as a measure of reliability." This measure he derives by an analysis of variance, treated by the methods of Neyman and Pearson rather than by that of Fisher (which I had adopted). He finds that, in some cases, the " sensitivity " may be decidedly small when the reliability coefficient is decidedly high, and therefore considers that the reliability coefficient may be rather misleading (*Brit. J. Psych.*, XXIX, 1939, pp. 267-287). Dr. Jackson's work appears to me to be of special value as showing that, in spite of the objections raised by earlier critics, the idea of using analysis of variance for problems of educational psychology is rapidly gaining recognition.

[3] Cf. *Psychometrika*, IV (1939), p. 271, para. 7. Teachers and others who wish to know how far these inferences would now be accepted by other educational psychologists may turn to the closing pages of the latest report of the Int. Inst. Examinations Inquiry cited above (*Marking of English Essays*, pp. 149-151), where Sir Philip Hartog has endeavoured, in consultation with Professors Spearman, Thomson, Hamley and myself, to draw up a statement embodying those conclusions which we should all be prepared to accept. I may add that, in determining the significance, reliability, and validity of psychological tests investigated for the fighting services, analysis of variance was recommended from the outset and has been increasingly used with success: (on the methods proposed and on the limitations of variance-analysis I may refer to my War Office (L.S.P.) memorandum on " The Advantages and Limitations of Correlational and Variance Methods," 1942, which will, I hope, shortly be published).

2.—Estimating the 'reliability' of tests, examinations or other school assessments, is as essential as estimating their 'validity,' and should always precede or accompany the latter, since the validity of a test can never exceed its index of reliability, and its apparent lack of validity may be due mainly to lack of reliability.

3.—Reliability, as above defined, may be most simply measured by analysing variance according to the principles introduced by Fisher. With this method it becomes possible to deduce both old and new formulæ without invoking any special or elaborate assumptions. In the rarer cases where the several assessments call for differential weighting, factor-analysis may in theory provide a better approach. But in practice variance-analysis yields much the same figure; and has the special advantage of being applicable where the test in question can be applied only once.

4.—Data at present available suggest that, for intellectual abilities, and particularly for special aptitudes, the "reliability" of teachers' assessments are far lower than that of tests; for educational attainments it is about equal; for moral qualities somewhat better. However, further research on these problems is urgently needed.

5.—Merely increasing the number of independent judgments will greatly improve a low reliability, though there is little gain in increasing them beyond four or five. The calculation of reliability coefficients by the methods described above indicates many other practical devices by which the reliability of teachers' assessments can be much enhanced.

Appendix: Proof of Formulæ.

Assumptions.—Let there be N persons assessed in n different ways (by teachers, examiners, tests, or test-items: for brevity I shall refer to them as tests). Let X_{ij} denote the ith person's mark or 'raw score' in the jth test, and x_{ij} the same reduced to deviation form. Our basic assumption will then be that X_{ij}, and therefore x_{ij}, may be analysed as an *unweighted* sum of three varying components, due to (1) the person tested; (2) the test used; and (3) a random error. Algebraically this can be expressed as follows:

$$x_{ij} = X_{ij} - A = p_i + t_j + e_{ij} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (i)$$

where A is the average of all the raw scores, p_i the ith person's average mark in the n tests, t_j the average mark of the N persons in the jth test, and e_{ij} the error of measurement.

Test of Significance.—On squaring both sides of (i), we find that the total sum of squares can be split into three components, each consisting of the sum of n × N squares; so that

$$\Sigma\Sigma x_{ij}^2 = n\Sigma p_i^2 + N\Sigma t_j^2 + nN\Sigma\Sigma e_{ij}^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (ii)$$

$$\text{or} \quad S = P + T + E \text{ (say)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (iii)$$

To find the 'mean squares' or 'variances' for these three components, we have merely to divide the square-sums by the corresponding degrees of freedom, obtaining (see Table I for an arithmetical illustration)—

$$\overline{P} = P/(N-1), \qquad \overline{T} = T/(n-1), \qquad \overline{E} = E/(N-1)\ (n-1).$$

If g_i denotes the 'true value' of i's total mark, $\overline{P} = \sigma_g^2 + \sigma_e^2$ and $\overline{E} = \sigma_e^2$. Consequently, had the raw marks been allotted at random, instead of being based on discriminative tests, we should expect that in the long run the average or total mark gained by each person would be the same; i.e., σ_g^2 would tend to be equal to 0, and $\overline{P} = \overline{E}$. Hence, to test whether the total marks obtained in the whole examination differentiate significantly between the several testees, we take as the critical ratio

$$F_p = \overline{P}/\overline{E}, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (iv)$$

the degrees of freedom being (N − 1) and (N − 1) (n − 1) respectively.

Reliability.—The reliability of the whole examination will then be

$$r_{tt'} = \frac{\sigma_g^2}{\sigma_g^2 + \sigma_g^2} = \frac{\overline{P} - \overline{E}}{\overline{P}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (v)$$

$$= \frac{nP - (S - T)}{(n-1)P} = \frac{n}{n-1}\left\{1 - \frac{S-T}{nP}\right\} \quad \ldots\ldots\ldots\ldots \quad (vi)$$

Average Intercorrelation.—For certain purposes we may require the correlation ratio or the intra-class correlation. These are given by

$$\eta_t^2 = \frac{P}{S-T} \text{ and } r_{int(t)} = \frac{N\eta_t^2 - 1}{N-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(vii)}$$

(See *Factors of the Mind*, p. 275). When the standard deviations are equal, the average intercorrelation $\bar{r}_{kk'} = r_{int(t)}$. We thus obtain a quick method of estimating the average intercorrelation between the various tests.

If the component tests all have a high reliability, their intercorrelations will not differ greatly; and then

$$r_{tt'} = r_{tg}^2 = \frac{n\bar{r}_{jj'}}{1+(n-1)\bar{r}_{jj'}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(viii)}$$

approximately, where r_{tg} is the 'index of reliability' and $r_{tt'}$ as before the 'coefficient of reliability.' (See *Marks of Examiners*, p. 303.)

Ranking Tests.—When the component tests or assessments are expressed by order of merit or 'ranks,' $T = 0$, and $S = \frac{1}{12} n N (N^2 - 1)$.

$$\text{Hence by vii, } \bar{r}_{jj'} = \frac{n(T/S)-1}{n-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ix)}$$

$$= \frac{12\Sigma p'}{n(N-1)N(N-1)} - \frac{3n(N+1)}{(n-1)(N-1)} - \frac{1}{n-1} \quad \ldots\ldots \text{(x)}$$

where p'_i is now used to denote the sum (not average) of the ranks awarded to the ith individual. Using formula iv the critical ratio becomes

$$F = \bar{P}/\bar{E} = \frac{12(n-1)P}{nN(N^2-1) - 12P} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(xi)}$$

Ranks, however, are discontinuous measurements; with small groups a correction should be introduced, analogous to those used in converting ranks to grades and applying significance tests to discontinuous frequencies. We then obtain

$$F = \frac{12(n-1)(P-1)}{nN(N^2-1) - 12(P-1) + 2} \quad \ldots\ldots\ldots\ldots\ldots \text{(xia)}$$

In strictness $n/2$ should then also be subtracted from the expression $(N-1)$ in calculating the degrees of freedom.

By equation (vi) the reliability coefficient for ranks is simply

$$r_{tt} = \frac{n}{n-1}\left(1 - \frac{S}{nP}\right)$$

$$= \frac{n}{n-1}\left\{1 - \frac{N(N^2-1)}{12P}\right\} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(xii)}$$

(Note.—The use of Pearson's formula for the probable error of a rank-difference correlation, adopted by Kelley, p. 194, Garrett, p. 362, and Woodworth, *Exp. Psych.*, p. 375, may lead to erroneous inferences. The significance-test of the correlation-ratio, described by Yule and Kendall, p. 454, reduces to equation xi, when allowance is made for the fact that the ranking method imposes $(n-1)$ additional constraints.)

Pass or Fail Tests.—When $T = 0$, equation vi reduces to

$$r_{tt'} = \frac{n}{n-1}\left(1 - \frac{S}{nP}\right) = \frac{n}{n-1}\left\{1 - \frac{\Sigma\sigma^2}{\sigma_t^2}\right\} \quad \ldots\ldots\ldots\ldots \text{(xiii)}$$

In composite tests, such as the Binet, what we have been calling the component tests are simply test-questions, for each of which the testee receives a mark of 0 or 1, according as he fails or passes. In such a case the variance for the jth test-question $= p_j q_j$, where p_j is the

proportion of testees answering correctly, and $q_j = 1 - p_j$ the proportion answering incorrectly. Hence

$$r_{tt'} = \frac{n}{n-1}\left\{1 - \frac{\Sigma p_j q_j}{\sigma_t^2}\right\} \quad \text{.............................(xiv)}$$

$$= \frac{n}{n-1}\left\{\frac{\sigma_t^2 - n\overline{p_j q_j}}{\sigma_t^2}\right\} \quad \text{......................... (xv)}$$

Equation xv is formula (20) of Kuder and Richardson, which has thus been deduced as a special case of equation vi, without invoking their restrictive assumptions.

Ungraded Tests.—In the Binet scale, the tests are 'graded,' i.e., increase progressively in difficulty. With what I have called 'ungraded' tests, where the test-items are equal or 'homogeneous' in regard to difficulty, equation xiv becomes

$$r_{tt'} = \frac{n}{n-1}\left\{1 - \frac{n\bar{p}_j\bar{q}_j}{\sigma_t^2}\right\} \quad \text{......................... (xvi)}$$

which is formula 21 of Kuder and Richardson.

Difference Formula.—With the Binet tests, when the range is wide, we have to remember that, owing to the increasing variability of higher I.Q.s, the reliability of high I.Q.s is greater than that of lower. To allow for this, when the children have been tested twice, we may use Kelley's difference formula for a correlation (Kelley, p. 180, eq. 131). We then obtain

$$r_{tt'} = \frac{\sigma_g^2}{\sigma_g^2 + \sigma_e^2} = \frac{\sigma_t^2 - \frac{1}{2}\sigma_d^2}{\sigma_t^2} = 1 - \frac{\pi(\bar{d})^2}{4\sigma_t^2} \quad \text{.............(xviii)}$$

(by eq. 48a, Kelley, p. 96).

A LIST OF RESEARCHES IN EDUCATIONAL PSYCHOLOGY AND TEACHING METHOD.

PRESENTED FOR HIGHER DEGREES OF BRITISH UNIVERSITIES FROM 1918 TO THE PRESENT DAY.

Classified according to Dewey's Decimal System by

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With a Foreword by F. A. CAVENAGH.

PART V.

159·982—SOCIAL PSYCHOLOGY (GENERAL).

Wedeck, J., Ability to estimate character.....Ph.D., London, 1933.
Champernownce, Honor I., The psychological interview (a survey of methods and practical results in cases of educational and occupational difficulty) .....Ph.D., London, 1940.
See also Magson, E. H., under Intelligence, 159·928 (1).
Leishman, A., Unemployment and temperament.....Ed.B., Glasgow, 1931.
Edwards, E. H., Some aspects of employment psychology.....M.Ed., Durham, 1932.
Orde, Faye, The psychological conditions in two representative factories. M.A., London, 1937.
Goodall, G. W., Some temperament traits in relation to industrial efficiency. A study of a group of workers by interviews, tests, assessments and records....Ph.D., London, 1938.
Fontaine, B. L. S., Human problems of organisation in industry.....M.Sc., London, 1939.
Wagner, Gertrud, Psychological factors in saving and spending.....M.A., London, 1939.
Chatterjee, P. H., Studies of labour wastage and sickness absence....Ph.D., London, 1941.
See also Barnett, Margaret, under Intelligence, 159·9281 (1).
O'Hanlon, G. S. A., under Intelligence Tests, 159·9282.
Stephen, Jane, under Intelligence Tests, 159·9282.
Sutherland, H. F. G., under Intelligence Tests, 159·9282.
Cohen, H. M., under Intelligence Tests, 159·9282.
McRae, C. R., under Intelligence Tests, 159·9282.

371·3—TEACHING METHOD.

GENERAL.

Parker, C. B., Teaching for culture.....Hons. Dip. Ed., Dublin, 1935.
Cullen, J. F., The new methods of teaching. A critical study Hons. Dip. Ed., Dublin, 1937.

371·33—PRACTICAL INSTRUCTION.

Neal, A. B., The place of practical instruction in education.....M.A., Wales, 1923.
Yusufuddin, K. M., Practical education.....M.A., Leeds, 1930.

371·335—AIDS TO INSTRUCTION-FILMS.

Lewis, A. M., The theory and practice of film observation: an experimental investigation into the child's attitudes to educational and entertainment films....M.A., London, 1938.

371·35—QUESTIONING.

Good, C. W., The influence of the form of a question upon children....M.A., London, 1937.

371·36—THE PROJECT METHOD.

Mohajer, A. R., The project method.....M.Ed., Leeds, 1937.

371·39—TEACHING METHOD—SPECIAL SUBJECTS.

(1) ART AND ÆSTHETICS.

Hendy, R., The teaching of drawing.....Hons. Dip. Ed., Dublin, 1931.
Wilson, W. R., The teaching of art.....Hons. Dip. Ed., Dublin, 1938.
Rosevere, Agnes M. B., The place of the æsthetic in education as determined by changing social conditions and its place in the curriculum.....M.A., Reading, 1940.

(2) DOMESTIC SUBJECTS.

Houghton, Clara, The teaching of domestic subjects in schools and training colleges. M.Ed., Manchester, 1918.

See also Eckersley, Ida M., under Teaching Method (Science).

(3) ECONOMICS.

Van den Toorn, K., The case for teaching economics in schools.....M.Ed., Leeds, 1939.

(4) ENGLISH.

Mason, J. E., The relationship between imagery and the teaching of English. M.Ed., Leeds, 1928.

Bagley, Dorothy, Critical analysis of objective studies in the teaching of English. M.A., London, 1935.
(Published in *B.J. Ed. Psych.*, Vol. VII, Parts 1 and 2, February and June, 1937.)

Talbot, G. B., The method of teaching the English group of subjects in junior technical schools. M.A., Wales, 1939.

Willmott, F. C., The provision of schemes of work in the English subjects for pupils of the new age group in senior modern schools.....M.A., Bristol, 1940.

Le Blanc, W., The teaching of English literature.....Hons. Dip. Ed., Dublin, 1942.

LANGUAGE.

Beecher, L. J., Language teaching in Kikuyu schools. (Studies in the teaching of English and other languages in the Kikuyu Schools of Kenya.).....M.A., London, 1937.

Moar, A., The teaching of the Mother Tongue in Great Britain and France, and the educational and psychological principles underlying it.....Ph.D., London, 1940.

COMPOSITION.

Bannon, J., On the teaching of written English composition. A study and comparison of results obtained from the accepted method with the results from an experimental method. Ed.B., Glasgow, 1939.

Cast, Beatrice M. D., An investigation on methods of marking composition. M.A., London, 1939.
(Published in *B.J. Ed. Psych.*, Vol. IX, Part 3, November, 1939; and Vol. X, Part 1, February, 1940.)

Morrison, R. L., A preliminary investigation into the efficiency of the Steel and Talman method of marking English composition.....Ed.B., Glasgow, 1940.
(See Morrison and Vernon: "A new method of marking English composition," *B.J. Ed. Psych.*, Vol. XI, Part 2, June, 1941.)

See also Brown, V. M., under Grammar.

DRAMATIC WORK AND PLAY PRODUCTION.

Dyer, E., (*a*) New aspects of dramatic work in secondary schools; and
(*b*) Producing school plays.....M.Ed., Durham (no date).

Kirkpatrick, W. G., Drama in the school. A discourse on teaching. Hons. Dip. Ed., Dublin, 1938.

GRAMMAR.

Brown, Victoria M., An experimental study of a new method of grammar teaching and its bearing on composition.....M.A., London, 1936.

READING.

Carey, R., Remedial work with backward readers.....Ed.B., Glasgow, 1928.

Scott, Elizabeth, 'Whole' and 'part' methods of reading for comprehension. (With a copy of "Prose of Our Time," edited by A. J. J. Ratcliff; Nelson, 1931.) M.A., Belfast, 1933.

Boyd, G., A comparison of the results of teaching reading by the sentence and phonetic methods. B.Ed., Edinburgh, 1934.

Brown, G., The relative value of phonetic and 'look and say' methods of teaching reading. Ed.B., Glasgow, 1936.

Holdsworth, L., Remedial reading for dull senior boys.....M.Ed., Leeds, 1939.

Taylor, E. A., An experimental approach to remedial reading for dull and backward junior pupils .....M.Ed., Leeds, 1942.

See also under Reading Ability, 159·928.

SPELLING.

Donaghy, Mary, A comparison of two methods of teaching spelling..Ed.B., Glasgow, 1936.
Bernard, Agnes M., An cxpcrimcntal study in spelling .....B.Ed., Edinburgh, 1930.
(Publishcd as a supplement to the *Scottish Edl. Jnl.* by thc Scottish Council for Research in Education.)
Payn, P. J., The spelling vocabulary.....B.Ed., Edinburgh, 1936.
McMillan, F. J., An investigation of spelling for the purpose of finding a method of teaching in primary schools.....Ed.B., Glasgow, 1937.
(Summary in *B.J. Ed. Psych.*, Vol. VIII, Part 1, February, 1938.)
Nisbet, S., The scientific investigation of spelling instruction in Scottish schools.
(Published in *B.J. Ed. Psych.*, February, 1939). B.Ed., Edinburgh, 1940.

VERBAL EXPRESSION.

Westgarth, G. N., The study in secondary schools of the technique of verbal meaning and expression by methods of word analysis.....M.Ed., Durham, 1940.

PHONETICS.

Davies, Mary, A comparison of the phonetic systems of English and Welsh, and the application of such comparative study in the practical teaching of English in Welsh schools.
M.A., Wales, 1923.
Curry, R. O. L., The theory, practice and application of expcrimental phonetic methods.
Ph.D., Durham, 1935.

BI-LINGUISTIC.

Evans, Ellcn, Bi-lingual education in Wales, with special reference to the teaching of Welsh.
M.A., Wales, 1924.
Bird, Patricia R., Bi-lingualism, a factor in educational, individual and racial psychology.
Ed.B., Glasgow, 1934.

(5) GEOGRAPHY.

Quayle, W. C., The psychology of the use of a map.....M.A., Liverpool, 1916.
Bradley, Elizabeth M., the history of the development of the teaching of geography in England from 1886 to date.....M.Ed., Manchester, 1917.
Parkinson, T. W. F., Investigation of the teaching of geography ..M.Ed., Manchester, 1921.
Pilkington, Evelyn M., Regional survey and its application to the teaching of geography.
M.Ed., Manchester, 1921.
Talbot, Maud, The placc of thc map in the study of geography....M.Ed., Manchester, 1921.
Brown, W. G., The place of geography in secondary and post-secondary education.
M.Ed., Manchester, 1929.
Petcr, D., The organisation of a climatological station in a school, and introduction of this work into the geography syllabus.....M.Ed., Manchester, 1930.
King, A. W., The value of films for classroom instruction in geography..M.Ed., Durham, 1941.
Jones, E. W., Psychological problems in the teaching of geography....M.A., London, 1931.
Moss, Phyllis G., Thc teaching of geography in the secondary school, with special reference to maps and map work.....M.A., Liverpool, 1931.
Glason, J. A., Scientific method in the teaching of geography, with special reference to geography in modern schools.....M.A., Reading, 1932.
Slater, H., Tho syllabus teaching and value of geography in a rural Fenland grammar school.
M.Ed., Manchester, 1933.
Wilson, A. E., An enquiry into the methods of teaching geography and sources of geography material .....M.Ed., Leeds, 1934.
Hodgson, H. B., The use and value of folk lore in the teaching of geography.
M.Ed., Leeds, 1935.
Jhingran, V., To find inter-relation between the various parts of geography, physical geography, general geography, applied geography, and map reading.....B.Ed., Edinburgh, 1936.
Cassidy, F. S., An experimental research on the problems of teaching geography to backward boys in present day senior schools.....M.Ed., Leeds, 1937.
Merriman, A. D., The teaching of geography in secondary and elementary schools.
M.Ed., Durham, 1937.
Hill, D. A., The Home Region. A study of its significance in the teaching of geography, with illustrations drawn from surveys of the Middle Lagan Valley.....M.A., Belfast, 1938.

(6) HANDWORK AND CRAFTS.

Lewis, W., The pedagogics of school handiwork.....M.A., Wales, 1913.
Kulkarni, R. A., The handwork movement in education: an historical and critical account. M.Ed., Leeds, 1930.
Smith, P. F., The mental and moral discipline of handcraft in schools..M.A., Liverpool, 1931.
Williams, G. A., Handicraft in education: its rise and progress in elementary and secondary schools .....M.A., Liverpool, 1936.
Lamb, H., 'Content' and 'technique' in handwork. An enquiry into (1) the relative popularity of technical and expressional methods of handwork teaching, and (2) their effects on character development.....M.Ed., Leeds, 1941. (Published in *B.J. Ed. Psych.*, Vol. XII, Part 1, February, 1942.)
Walsh, T., The principles underlying the teaching of handwork, with special reference to the junior school .....M.A., Leeds, 1941.

(7) HISTORY.

Williams, S. H., Teaching pupils how to study, with special reference to the teaching of history. M.A., London, 1918.
Bowman, Florence L., The teaching of history in the elementary training college and public elementary school.....M.Ed., Manchester, 1919.
Hasluck, Eugene L., The teaching of history.....M.A., London, 1919.
Sankey, W. H., The teaching of history in preparatory schools....M.Ed., Manchester, 1923.
Shaw, H. B., The teaching of local history, with examples from the old Yorkshire Kingdom of Elmet .....M.Ed., Leeds, 1924.
Barter, A., The teaching of history.....M.A., Liverpool, 1926.
Jones, C. E., The teaching of history to boys of eleven and fifteen .....M.Ed., Leeds, 1926.
Woodhouse, M. T., The place and value of local study in the elementary school. M.Ed., Leeds, 1926.
Priestley, H. E., The pre-historic age as a subject for school study ....M.Ed., Leeds, 1928.
Gregory, M. V., The place of social and economic history in education. M.Ed., Manchester, 1929.
Nunn, Elsa S. H., The subject matter of history in junior schools....M.A., London, 1929.
Wilshere, Phyllis N., An attempt to consider a syllabus in world history suitable for a year's course in a senior school.....M.A., London, 1931.
Blake, A. H., The history syllabus of the senior school: being a consideration of the principles of selection .....M.A., London, 1934.
Selley, W. T., A critical examination of a deductive method of teaching history in secondary schools.....M.Ed., Manchester, 1939.

(8) LATIN AND GREEK.

Lythgoe, N. L., The teaching of elementary Latin in grammar schools from the Middle Ages to 1750.....M.Ed., Manchester, 1918.
Fothergill, F. S., Latin in the secondary school.....M.Ed., Durham. (No date.)
Worden, C. N., The teaching of Latin in England: a critical and historical survey. Ph.D., London, 1938.
Hally, E. G., Methods of teaching classics.....Hons. Dip. Ed., Dublin, 1940.
See also Hope T., under Latin Ability, 159·928.

(9) MATHEMATICS.

(a) *Mathematics—general.*

Ross, J. S., The doctrine of recapitulation in its application to the teaching of mathematics. M.A., London, 1923.
Ruscoe, R. G., The place of mathematical history in school mathematics..M.A., London, 1925.
Jackson, T. H., The teaching of mathematics, etc.....M.Ed., Manchester, 1927.
Williams, F. J., Practical mathematics: the approach of the post-primary pupil to the study of mathematics .....M.Ed., Manchester, 1928.
Wilson, D. K., (a) Some of the text-books used in the teaching of elementary mathematics in Scotland prior to the year 1800;
(b) Development of the mathematical curriculum in the Scottish schools during the same period.....Ph.D., Glasgow, 1932.
McWillie, Jane, Mathematics and general science in English education. M.A., Liverpool, 1933.

Batten, T. C., The teaching of elementary mathematics in secondary schools. M.A., Liverpool, 1934.
Retter, C. F., The history of the teaching of school mathematics in England during the last fifty years ..... M.A., London, 1936.
Dibden, H., Mathematics teaching in senior schools based on the suggestions of the Board of Education pamphlet No. 101 ..... M.A., Bristol, 1937.
Hoggarth, N. R., The relative values of certain individual and group methods used in practice periods in the teaching of elementary mathematics ..... M.A., London, 1938.
Jones, H. G., A critical account of certain experiments in the realist approach to the teaching of mathematics in post-primary schools ..... M.A., Liverpool, 1941.
Keane, Joan, The teaching of arithmetic, elementary geometry and algebra. Hons. Dip. Ed., Dublin, 1941.

See also Goom, W., under Adolescence.

(b) *Arithmetic.*

McClelland, W., An experimental study of the different methods of subtraction. (Published in *J. of Exp. Pedagogy*, Vol. IV.) B.Ed., Edinburgh, 1918.
Hughes, A. G., The practice value of games in arithmetical problems. M.Ed., Leeds, 1922.
Shendarkar, D. D., An experimental investigation in teaching to solve problems in arithmetic, and the light it throws on the doctrine of formal training ..... Ph.D., London, 1930.
Low, H. R., Whether the difficulty of arithmetical problems lies in the reading comprehension. Ed.B., Glasgow, 1931.
Muir, P., Is situation a factor in the solving of an arithmetical problem? Ed.B., Glasgow, 1931.
Morfitt, Margaret D. K., Comparison of individual-concrete methods, and class methods in the teaching of arithmetic ..... Ed.B., Glasgow, 1936. (Published in *B.J. Ed. Psych.*, Vol. VII, Part 2, June, 1937.)
Birtwistle, J. A., A comparative study of the results of homogeneous and heterogeneous work in mental arithmetic ..... M.A., London, 1936.
Mackay, Isobella H., A study of zeros in elementary arithmetic .... Ed.B., Glasgow, 1938. (Summary in *B.J. Ed. Psych.*, Vol. IX, Part 1, February, 1939.)
Curr, W., The age placement of topics in arithmetic ..... Ed.B., Glasgow, 1939. (Published in *Studies of Arithmetic*, Vol. II; a publication of the Scottish Council for Research in Education.—University of London Press.)
Gardner, P. A. D., An analysis of errors in fractions ..... Ed.B., Glasgow, 1939. (Published in *Studies of Arithmetic*, Vol. II; a publication of the Scottish Council for Research in Education.—University of London Press.)
Murray, Margaret, An investigation into the merits of much use of concrete material in arithmetic teaching in the infant department ..... B.Ed., Edinburgh, 1941.
Flavell, J. S., Arithmetic in the senior school ..... M.A., Birmingham, 1942.

See also Williams M., under Reasoning, 159·9556.

(c) *Geometry.*

Jackson, G. B., The teaching of geometry ..... M.Ed., Manchester, 1924.
Garner, Wilhelmina, A supplementary school course in geometry, designed for more advanced students ..... M.Ed., Manchester, 1930.
Bond, B. H., A psychological approach to the teaching of geometry .. M.A., Birmingham, 1935.

(10) MODERN LANGUAGES.

Stafford, F. J., Modern language text-books (French and German) in school teaching. M.Ed., Manchester, 1918.
Baker, W. A., The direct method in modern language teaching; its origin and development. M.Ed., Manchester, 1924.
Pascoe, F. L., A comparison of the aims, conditions and methods of teaching French to the child and the adult, with special reference to secondary schools and London senior commercial institutes ..... M.A., London, 1929.
Hill, J., A critical study of Quintilian's system of language teaching .. M.A., Sheffield, 1930.
Armstrong, Constance E., The teaching of the Mother Tongue in French secondary schools for girls ..... M.Ed., Leeds, 1931.
Wormald, S., The teaching of modern languages in France ..... M.Ed., Leeds, 1933.

Jacka, A. A., The influence of present day linguistic theory on methods of teaching modern languages in schools.....M.A., London, 1934.
Lewis, J. E. L., Modern French teaching.....Hons. Dip. Ed., Dublin, 1935.
Buchanan, J. K., An experiment to find the value of the gramophone in teaching oral reading in French.....Ed.B., Glasgow, 1939.
Sargent, Barbara K., The teaching of the vernacular in French secondary schools. M.A., Reading, 1940.

See also Lce, A., under Adolescence, 159·92.

(11) MUSIC.

Merrick, F. G., The place of music in school education.....M.Ed., Manchester, 1920.
Payne, E. M., The problem of listening to music.....M.A., Bristol, 1933.
Dale, R. R., Use of visual and auditory aids in the class teaching of music. M.Ed., Leeds, 1936.
Fussell, J. H., Music in primary and secondary schools, with special reference to its æsthetic and disciplinary values.....M.A., Bristol, 1936.
Sykes, J. M., Ideals in school music.....M.A., Bristol, 1939.
Hooper, C., Music in elementary education.....M.A., Leeds, 1942.
Priestley, E., Percussion playing and recorder playing in school....M.Ed., Leeds, 1942.

(12) PHYSICAL EDUCATION AND PHYSICAL TRAINING.

Roper, R. E., The relation of physical education to school life....M.Ed., Manchester, 1915.
Livingston, A. E., An investigation into certain aspects of physical education Ed.B., Glasgow, 1939.
Milverton, F. J., An experimental investigation into the effects of physical training on personality .....M.Ed., Leeds, 1940.

(13) RELIGION.

Foulger, T. R., The psychological approach to religious education.....M.A., London, 1930.
Bellamy, D., Religious teaching in secondary schools.....M.Ed., Leeds, 1932.
Popham, F. S., Religious education: a life process.....Ph.D., Dublin, 1933.
Roach, K. M., The teaching of religious knowledge in secondary schools. M.A., Birmingham, 1934.
Thomson, J. G. M., The religious tradition in children and adults..Ed.B., Glasgow, 1935.
McPherson, J. A., A comparative study of the self-teaching and expository methods in day school religious instruction .....Ed.B., Glasgow, 1937.
(Summary in *B.J. Ed. Psych.*, Vol. VIII, Part 1, February, 1938.)
Backhouse, W. H., The religious and moral training of the adolescent..M.Ed., Leeds, 1940.
Grocock, T. A., Religious instruction in secondary schools: an enquiry and some suggestions. M.A., Birmingham, 1940.
Millar, L., The teaching of religion.....Hons. Dip. Ed., Dublin, 1941.
Star, L. P., The psychology of religious expression and its relation to religious education. Ph.D., Dublin, 1942.

(14) SCIENCE.

(a) *General.*

Jardine, Evelyn E., Principles of science with application to certain problems in the teaching of physics and chemistry.....M.A., Liverpool, 1916.
Eckersley, Ida M., The teaching of science in its relation to domestic subjects. M.Ed., Manchester, 1921.
Rumsey, G. R., The contribution of science teaching to moral training..M.A., London, 1926.
White, A. J., Some problems in the teaching of science.....M.A., London, 1926.
Rowland, Irene, A survey and criticism of the scope of natural science teaching in girls' secondary schools with proposals for increasing its practical value. M.A., Liverpool, 1927.
Holmyard, E. J., (1) Work on the history of chemistry in mediæval Islam;
(2) Work on the teaching of chemistry in this country. D.Litt., Bristol, 1928.
Turner, F. W., Scientific method, as exemplified in qualitative analysis..M.A., London, 1928.
Morris, J., The position and teaching of science in co-educational schools. M.A., Liverpool, 1929.

Hall, J. A., An historical survey of science instruction in Liverpool....M.A., Liverpool, 1930.
Howard, W. N., An investigation into the relative value of methods of teaching science in selective central schools.....M.Sc., Sheffield, 1930.
Samad, S., The origin and development of science teaching in English schools. M.A., Leeds, 1930.
Hall, W., The teaching of science in England during the latter half of the nineteenth century. M.A., Sheffield, 1931.
Fielding, W. R., Science teaching in the junior school.....M.Ed., Manchester, 1932.
Glenister, Dorothy A., The scientific interests of girls .....M.A., London, 1932.
Morgan, L. G., The teaching of science to the Chinese.....M.A., London, 1932.
Wood, C. W., Science in the secondary school: its adaptation to an appreciation of life. M.Ed., Manchester, 1933.
Moffat, A. B., Natural science as an element in a liberal education: its proper place and treatment in the curriculum of schools.....M.A., Liverpool, 1934.
Murphy, J. C., Science teaching in schools with respect to the proposed reorganisation of the education system .....M.A., Liverpool, 1934.
Smith, L. G., An investigation into the teaching of science to non-science specialists at the post-certificate stage, with special reference to the needs of these pupils in later life. M.A., London, 1934.
Bevers, C., The treatment of some scientific activities in the senior school. M.Ed., Leeds, 1935.
Dinsmore, E. R., Science and observation.....M.A., London, 1935.
Staton, W., The teaching of science in elementary schools .....M.A., Liverpool, 1935.
Simmonds, L. F. R., A comparative study of the scientific interests of adults and boys of the same social class .....M.A., London, 1936.
Law, S., The first two years of general science work in a secondary school. M.Ed., Manchester, 1937.
Nunn, G., Science in the senior school.....M.A., Liverpool, 1937.
Burrell, J., Science teaching.....Hons. Dip. Ed., Dublin, 1938.
Comber, L. C., The scientific interests of children in relation to the teaching of science. M.A., London, 1938.
Atherton, W., The modern approach in science teaching.....M.Ed., Manchester, 1939.
Richards, T. T., The interests of boys in the junior forms of a secondary school in relation to the teaching of science.....M.A., Wales, 1939.
Foster, C., The influence of science teaching on the development of secondary education, with special reference to the City of Birmingham.....Ph.D., London, 1940.
Lawton, J. A., A survey of science teaching in the senior school .....M.A., Leeds, 1940.
Richardson, T. A., Science in Chinese education.....M.Ed., Durham, 1940.
See also Hughes, A. G., under Intelligence Tests.

(b) *Nature study, botany, biology.*

Parkin, Jessie, The history of the teaching of botany and nature study in schools. M.Ed., Manchester, 1918.
Lennon, Annie, The teaching of botany in the history of secondary education. M.Ed., Manchester, 1921.
Rutherford, Ellen J., Biology and education.....M.A., Liverpool, 1927.
Roberts, Alice, A critical study of some mechanical aids in the teaching of botany. M.A., London, 1933.
Ottaway, A. K. C., An experimental study of the biological interests of school children. M.A., London, 1935.
Pritchard-Jones, W. A., Biology in education.....M.Ed., Durham, 1935.
Tyrer, F., A record of ten years' work and experiments in the teaching of biology in a senior elementary school .....M.A., Liverpool, 1940.
Richmond, W. K., Bird study in the junior school.....M.Ed., Durham, 1941.

(c) *Chemistry.*

Ward, W. C. J., The proper scope of quantitative work in science in secondary schools, with special reference to chemistry.....M.A., London, 1927.
Milnes, H., The educational value of chemistry, with proposals for its treatment in the school curriculum .....M.A., Liverpool, 1928.

Ferriday, A., The place of chemistry in a rural secondary school....M.Sc., Liverpool, 1930.
Lewis, B. A., A critical analysis of didactic methods in chemistry, and their effect upon the educational development of the child.....M.A., Liverpool, 1930.
Newbury, N. F., The basic difficulties of chemistry teaching in the matriculation course, with special reference to practical work.....M.A., Liverpool, 1931.
Pullan, J. M., School text-books in chemistry.....M.A., London, 1932.

(d) *Physics.*

Phillips, J. E., The educational value of the study of physics, from the standpoint of method. M.A., Wales, 1924.
Kay, L. J., Physical science in the non-selective modern school.....M.A., London, 1929.
Glyn-Wilkinson, H., Adolescent education in county boroughs and industrial districts, and the place of physics in the reorganised schools.....M.Ed., Durham, 1932.
Armstrong, H., Laboratory technique in the teaching of physics....M.Ed., Durham, 1933.
Henthorne, T. K., The teaching of physics in secondary schools (up to the standard of the school certificate examination) .....M.A., Liverpool, 1933.
Brown, B. F., The teaching of physics to junior pupils (ages 11½ to 14½ years) with particular regard to the period 12½–13½ years .....M.A., Liverpool, 1938.
See also Gordon, Marjorie, under Vocational Guidance, 159·98.

This concludes the Index.

SUMMARIES OF RESEARCHES REPORTED IN DEGREE THESES.[1]

The Attitude of Grammar School Pupils and their Parents to Education, Religion and Sport.

By WILLIAM GLASSEY.

An abstract of a thesis presented to the University of Manchester for the Degree of Master in Education.

The aims of the investigation were to study the attitudes of children and their parents towards education, religion, and sport, to ascertain the extent to which the attitudes of the boys and girls are related to those of their parents, to compare the attitudes of the boys with those of the girls, to find whether the attitudes studied are related to scholastic attainment or not, and as far as possible to discover the chief factors which had influenced the formation of the attitudes.

A modification of the technique described by L. L. Thurstone and E. J. Chave in "The Measurement of Attitude" was used. Two modifications are worthy of notice. (i) Whereas Thurstone and Chave have used an unselected group of 300 sorters, in this investigation only forty sorters were employed. These, however, were carefully selected and instructed in the process of sorting. The results showed that such a number is sufficient. (ii) Thurstone and Chave used forty-five statements in their scale for measuring attitude towards the church. In this experiment thirty-four statements were used. Satisfactory scales containing only twenty statements have been published by the University of Chicago Press. Since it deals with a variety of topics, this technique is more reliable than a single subjective statement of attitude. For instance, a boy may say that his attitude to education is highly favourable, yet when he is asked to endorse or reject a number of statements of different degrees of favour or disfavour and dealing with different topics—e.g., the usefulness of education, its power in character-building, its influence for good or ill on the community, its purpose, schools, etc.—the result may show that his own opinion of his attitude is incorrect, for on some topics he may reveal an unfavourable attitude. By taking an average of his attitudes to all these topics a truer valuation of his attitude may be obtained. In order to do this, the statements have to be arranged on a scale in order from those expressing the most favourable attitude through a neutral zone to those expressing the most unfavourable attitude, and they have to be given a numerical equivalent. The technique used by Thurstone and Chave does so in a more objective and more precise manner than any other method yet devised. Instead of arbitrarily fixing the position of the statements on the scale of attitude himself, the investigator asks a number of persons (in this investigation forty men and women were used) to sort them in order into eleven piles. Three criteria were used in selecting the sorters. Men and women were chosen who were representative of various walks in life, who were capable of making nice judgments, and who showed interest in the investigation. The group consisted of heads of schools, assistant masters and mistresses, lecturers, doctors, dentists, clergymen, accountants, solicitors, and directors of business firms.

By taking the average of these sortings it is assured that the result will be almost entirely free from personal bias. By carefully recording these sortings and plotting them on a graph it is possible to determine the scale value of each statement and to express it numerically, and by noting the range of the scale over which the statements are spread by the sorters it is possible to discover which statements are too ambiguous and to remove them from the scale. In this investigation thirty-four statements were selected which covered all points of the scale and which were approximately equal distances apart. The weakness of the technique is that the attitude scale is made up of verbal expressions of opinion which may be misinterpreted, especially by children.

The following scale for measuring attitudes towards education will serve as an example of the three scales. The figures in brackets at the end of each statement indicate the scale-value of the statement.

[1] These Outlines must be submitted through the Head of the Department in which the research was carried out.

ATTITUDES TOWARDS EDUCATION.

Name .... *Age*..... *Years*..... *Months* *Form*... ....

Below are a number of statements about ***education***. We want to know what you feel about this subject. Please read the statements carefully and then :

(i) Put a tick (√) if you FULLY agree with a statement.

(ii) Put a cross (×) if you do not FULLY agree with a statement.

1.—I am intensely interested in education. (1·0)
2.—I go to school only because I am compelled to do so. (10·0)
3.—I am interested in education but think that one ought not to get too concerned about it. (4·2)
4.—I like reading thrillers and playing games better than studying. (6·4)
5.—Education is of first-rate importance in the life of man. (0·5)
6.—Sometimes I feel that education is necessary and sometimes I doubt it. (5·4)
7.—I should not do much work if I did not have to pass examinations. (6·9)
8.—Education tends to make people snobs. (8·4)
9.—I think time spent studying is wasted. (10·1)
10.—It is better for boys and girls to get jobs when they are fourteen than to continue at school. (7·9)
11.—It is doubtful whether education has improved the world or not. (5·7)
12.—I have no desire to have anything to do with education. (10·9)
13.—We cannot become good citizens unless we are educated. (1·3)
14.—More money should be spent on education. (2·2)
15.—I think my education will be of use to me after I leave school. (3·7)
16.—I always read newspaper articles on education. (3·0)
17.—Education does more harm than good. (9·3)
18.—I see no value in education. (11·4)
19.—Education enables us to live a less monotonous life. (3·3)
20.—I dislike education because it means that time has to be spent on homework. (7·4)
21.—I like the subjects taught in school but I do not like attending school. (4·5)
22.—Education is doing far more harm than good. (10·5)
23.—Lack of education is the source of all evil. (2·3)
24.—Education enables us to make the best possible use of our lives. (0·3)
25.—Only educated people can enjoy life to the full. (1·2)
26.—Education does far more good than harm. (2·7)
27.—I do not like school teachers so I somewhat dislike education. (7·1)
28.—Education is all right in moderation. (4·9)
29.—It is enough that we should be taught to read, write, and do sums. (5·8)
30.—I do not care about education so long as I can live comfortably. (8·9)
31.—Education makes people forget God and despise Christianity. (9·9)
32.—Education is an excellent character builder. (1·8)
33.—Too much money is spent on education. (8·6)
34.—If anything, I must admit a slight dislike for education. (6·7)

Completed scales were received from three hundred Grammar School children (148 boys and 152 girls), between the ages of eleven and eighteen years, and from 348 of their parents (173 fathers and 175 mothers.).

An individual's score was taken as the arithmetic mean of the scale-values of all the opinions he endorsed. This seems reasonable because there is the same number of statements that he may approve in each class-interval. The score of a group was represented by the mean of the scores of the individuals who composed the group.

The possible range of scores was 0·00 to 11·00. The lower the score the more favourable was the attitude. The following scale was used in interpreting the scores :

0·00 to 2·20 strongly favourable attitude.
2·21 to 4·40 moderately favourable attitude.
4·41 to 6·60 neutral attitude.
6·61 to 8·80 moderately opposed attitude.
8·81 to 11·00 strongly opposed attitude.

1.—*General Conclusions.*

(*a*) The attitudes of boys and girls and their parents, as shown by the mean attitude scores, are moderately favourable to all three subjects.

TABLE I.

MEAN ATTITUDE SCORES.
(*The figures in brackets are the S.D.s of the means.*)

	Boys.	*Girls.*	*Boys and Girls.*	*Mothers.*	*Fathers.*	*Parents.*
Education	2·99 (0·071)	2·83 (0·075)	2·91 (0·052)	2·47 (0·051)	2·54 (0·058)	2·50 (0·038)
Religion	3·81 (0·098)	3·03 (0·068)	3·41 (0·064)	3·05 (0·058)	3·46 (0·089)	3·25 (0·052)
Sport.....	2·72 (0·072)	2·49 (0·051)	2·60 (0·045)	2·85 (0·068)	2·83 (0·069)	2·84 (0·046)

(*b*) The girls showed more favourable attitudes towards religion and sport than did the boys. Although the mean attitude score of the girls towards education was lower than that of the boys, the 'critical ratio' $\left(\frac{\text{difference between means}}{\text{S.D. difference between means}}\right)$ showed that the difference was not significant. The same measure showed that, in the comparison of mean scores of parents with those of children, the parents' more favourable attitude to education and the children's more favourable attitude to sport were significant, whilst the difference in mean scores of attitude towards religion was unreliable.

TABLE II.

DIFFERENCES BETWEEN MEAN ATTITUDE SCORES, AND THE 'CRITICAL RATIOS' OF THESE DIFFERENCES.

		Education.	*Religion.*	*Sport.*
Boys and Girls	Difference	·16	·78	·23
	Critical Ratio	1·6	6·5	3·1
Parents and Children	Difference	·41	·16	·24
	Critical Ratio	6·34	1·95	3·75

(*c*) The attitudes of the children were correlated with those of the parents. The Pearson product-moment formula gave the following co-efficients for groups of approximately ninety:

TABLE III.

CO-EFFICIENTS OF CORRELATIONS OF ATTITUDES OF PARENTS WITH THOSE OF CHILDREN.

	Girls with		*Boys with*	
	Mothers.	*Fathers.*	*Mothers.*	*Fathers.*
Education	+0·57 (±0·046)	+0·07 (±0·064)	+0·28 (±0·054)	+0·35 (±0·066)
Religion	+0·01 (±0·067)	+0·14 (±0·07)	+0·37 (±0·065)	+0·35 (±0·066)
Sport	+0·44 (±0·055)	+0·14 (±0·068)	+0·51 (±0·055)	+0·29 (±0·069)

Generally speaking the child's attitude was more closely related to that of the mother than to that of the father. The absence of correlation of the attitude of girls towards religion with that of their mothers and the greater correlation of the boys' attitude to sport with that of their mothers than with that of their fathers will be noted.

(*d*) Two groups of boys and girls—those in the third and fourth years of their school careers—were examined to see if there was any correlation between attitude and ability in school as measured by the terminal examinations.

For education, the product-moment formula gave co-efficients of +0·49 (±0·072) and +0·57 (±0·064) for the third and fourth-year groups respectivcly. Correlation, therefore, was positive and marked.

The co-efficients for religion and sport were insignificant.

2.—*Attitude towards Education.*

(*a*) The attitude of the children in the " B " forms grows steadily more unfavourable as they move up the school, whilst in the "A" forms, although the attitude becomes less favourable, the difference is slight.

(*b*) The mean attitudc scores of the forms revealed that attitude towards education tends to vary in accordance with scholastic attainment. The "A" form in each year had a mean attitude score more favourable than the " B " form. A difference of 0·43 in favour of the "A" forms gave a ' critical ratio ' of 4·02.

(*c*) When the mean scores of attitude towards education were plotted graphically, the curve showed a regular rise towards more unfavourable attitudes as it represented higher forms in the school. At the point which represented the form which was studying for the School Certificate examination, however, the attitude was more unfavourable than the curve would have led one to expect.

(*d*) An examination of the statements which won most approval showed that nearly all (88 per cent. of children and 78 per cent. of parents) had a strong sense of the importance of education. This value was set upon it because of its usefulness (97 per cent. children and 71 per cent. parents) and its power in character development (90 per cent. children and 88 per cent. parents). 83 per cent of the children and 73 per cent. of the parents thought that more money should be spent on it.

A distinction was made by the subjects of the investigation between the importance of education and the interest which it arouses. Although so many regard education as important, a large proportion (36 per cent. children and 48 per cent. parents) were only moderately interested, This was said to be due to the methods employed (especially homework), the system, and the teachers.

3.—*Attitude towards Religion.*

(*a*) As the child moves up the school the attitude expressed towards religion becomes less favourable.

(*b*) The attitude of the girls is decidedly more favourable than that of the boys. The ' critical ratio ' of the difference was 6·5 (see Table II).

(*c*) The mean attitude scores of the " B " forms are less favourable to religion than those of the "A" forms, but the ' critical ratio ' of 1·8 shows that this difference is unreliable.

(*d*) A consideration of the unfavourable attitudes which were most frequently endorsed shows that the attitude is made notably less favourable by the dislike of dull tedious services (48 per cent. boys, 24 per cent. girls, and 20 per cent. parents) and by the difficulties of living a religious life (89 per cent. children and 93 per cent. parents).

4.—*Attitude towards Sport.*

(*a*) There was no evidence to show that attitude towards sport was correlated with scholastic attainment.

(*b*) The girls showed a more favourable attitude than the boys, and the children than the parents. The ' critical ratios ' were 3·1 and 3·75 respectively.

(*c*) Only slightly more than half the subjects considered sport of first-rate importance, yet the attitudes with which the largest numbers were in agreement testified to the keen interest which it awakes. There was widespread appreciation not only of the delights of physical exercise but also of the value of sport as a means of relief from duller occupations (90 per cent. children and 91 per cent. parents), as a power for developing character (63 per cent. children and 80 per cent. parents), and as an opportunity for displaying skill (96 per cent. children and 80 per cent. parents).

BOOK REVIEWS.

Intelligence Tests for Young Children: By C. W. VALENTINE, M.A., D.Phil. (Methuen, 1945, pp. xi+68, 4s.).

For long there has been an urgent need for some simple scale of intelligence tests for use with younger children in this country. The best known scales, such as the Terman-Merrill revision or the Binet tests, require apparatus that is at once bulky and expensive; and, further, they have been constructed and standardised for American rather than for British children. This collection compiled and standardised by Professor Valentine is intended for teachers who wish to test children between the ages of 2 and 8. Most of the material is supplied in the form of diagrams and pictures in the book itself; the remainder consists of simple apparatus which can be readily found or made in any school or home.

Intelligence (as the psychologist uses the term), just because it is innate, changes little, if at all, during childhood, apart, of course, from maturation with age; and it is therefore desirable that every child's intelligence should be assessed, as accurately as possible, before he leaves the Infant School at latest. The range of Professor Valentine's scale makes it suitable, not only for use with school children during the 'infant' stage, but also for children of nursery schools, for children in the first year or two of the junior school, and for dull, backward, or mentally defective children up to the chronological age of about eleven.

The author has selected from various well-known scales those tests which are of recognized validity and at the same time easy and interesting to apply; but in addition he has devised some extremely ingenious and attractive tests of his own. The clear and detailed instructions make the procedure perfectly comprehensible even to those with little or no formal training in the technique of mental testing, and include suggestive comments which could be read with advantage even by experienced testers at child guidance clinics. The construction, standardisation and different uses of the tests are fully described in an Appendix; and the discussion incidentally brings out several pressing problems, which deserve the attention of future research workers. The amount of useful and instructive matter here packed into one small volume makes it a miracle of condensation; and the whole is based on a unique combination of common sense, scientific insight and a life-long study of the problems of early childhood. A word of gratitude is due to the publishers for the excellent production under war-time conditions.

C. BURT.

The Lady of the Hare: By JOHN LAYARD. (London, Faber and Faber, pp. 277, 12s. 6d. net.)

The author of this interesting book was a field anthropologist and is now a psycho-therapist. He has given us a clear account of a long dream-analysis along Jungian lines. This involves the interpretation of twenty-five dreams and visions and the recording and analysis are extremely interesting and illuminating as an illustration of method of procedure. Incidentally, the importance of what might be termed "psychological insight" on the part of the analyst is demonstrated, for the student is left wondering what might have happened at certain critical points of the treatment if the analyst had followed another line of association. The account of this analysis together with a brief discussion of the theory underlying the method occupies the first hundred pages of the book.

In one of the recorded dreams the woman (the subject of the analysis) sacrificed a hare which offered itself as a willing victim. The significance of this in the dream interpretation set Mr. Layard on investigation and research into the mythology of the hare. These results occupy the rest of the book and chapters deal with the hare in India, in China, in North America, in Ancient Egypt, in Africa, in Europe, in Classical Antiquity. All these results go to show that the hare is an archetype, in the sense used by Jung. This part of the book is written in an easy pleasing style and is illustrated with delightful pictures.

There is plenty of material here for further examination. Mr. Layard has promised two more volumes showing the continued dream experiences of the woman and the importance of the "Hare as Archetype in the Collective Unconscious." These books will be eagerly anticipated by many readers. The author will not convince all readers of this volume, but many will be prepared to suspend judgment until Mr. Layard has provided them with more information. In the meantime he has given us a fascinatingly interesting book.

E.C.C.

Youth Organisations of Great Britain, 1944-45: General Editor, DOUGLAS COOKE, M.C., M.A. (Jordan and Sons, Ltd., London, 8s. 6d.)

"The Reference Book of the Service of Youth in Britain" is the accurate description of this useful compendium. As the Chairman of the Youth Advisory Council, Mr. J. F. Wolfenden, C.B.E., says in a foreword: "The facts and statistics, as well as the ideals and aspirations, have been supplied by the organisations themselves." Here is a comprehensive and authoritative handbook, in which one may find information on Pre-service, Denominational and Political Organisations, as well as all the great voluntary organisations and bodies like the British Drama League and Youth Hostels which serve youth. Three Area surveys by education officers complete the picture of Britain's statutory and voluntary services.

R.M.P.

An Introduction to Child Guidance: By W. MARY BURBURY, EDNA M. BALINT, BRIDGET YAPP. (London, Macmillan and Co., Ltd., pp. vii+200.)

This book is an account of the organisation, aims and methods of a Child Guidance Clinic. It has been written jointly by three members of the Child Guidance team, namely a psychiatrist, a psychologist, and a psychiatric social worker. Each contributes chapters dealing with her own specialised work within the field of Child Guidance.

The descriptions of the routine work of the clinic are concise and informative, and are based on wide experience of the variety of cases which find their way to Child Guidance Clinics. The text is abundantly illustrated by case histories and clinic anecdotes, which make enjoyable and fascinating reading, and give readers vivid glimpses of the day to day happenings in a clinic.

Particular mention must be made of the admirably lucid chapters on the social side of the work. Miss Yapp herself says of the social worker that "she must cultivate the art of concise graphic description, concentrating always on essentials and limiting her use of the wealth of detail at her disposal to the illustration of salient points"—she has done so.

Teachers, and others, who though themselves not trained testers, find occasion to use intelligence tests will find valuable information in the chapter on testing. Here all aspects of the individual test and interview are considered and the significance of the child's reactions to the situation discussed.

The fact that each of the authors of this book has a bias towards psycho-analytical work has resulted in undue emphasis on this aspect of Child Guidance. This bias is particularly noticeable in the chapters on Maladjustment in the School and on Remedial Teaching, where emotional conflicts and stresses are dealt with, but little attention is paid to difficulties due to individual variations in the cognitive and perceptual spheres.

The psycho-analytical trend of the book may also account for omission of reference to temperamental tests and assessments. E.M.J.

The Language and Mental Development of Children: By A. F. WATTS. (George G. Harrap and Co., Ltd., pp. 354, 12s. 6d.)

This book gives a comprehensive survey of the development of children, from the earliest stages, in language and thinking and their relation to the maturing of special abilities and general intelligence. The author writes with a wide background, both of the special topics which he discusses and of English literature in general. No book known to the reviewer deals with the subject so comprehensively and so thoroughly.

Early chapters deal with the function and development of language and its relation to intelligence; the growth of vocabulary from the earliest months to adulthood; with learning to read and the various methods of teaching it; and with the writing of English at all stages. Then the author takes up more [illegible] topics connected with his main problem, such as the child's understanding of the [illegible] of cause and effect, of number and of time; the child's understanding of [illegible]ter and its relation at various stages to the kinds of reading suitable for those [illegible]ling of metaphor and analogy, and, finally, language as an expression of feeling, and the stages of æsthetic development.

Throughout the book there are many references to experimental and statistical enquiries—a number of them by the author; and in the appendices more details are given of these and of the various materials supplied in tests for vocabulary, sentence construction, reading scales, etc.

The author writes clearly and with balanced judgment. There is a refreshing absence of dogmatism, and there is little for the psychologist to criticise though the statistician would no doubt wish for more precise statements and exact treatment of numerical results. The book should be of great value not only to teachers of English, but to students in training when they are beyond the more elementary stages in psychology and the teaching of English. C.W.V.

The Physical Basis of Personality: By V. H. MOTTRAM. (Pelican Books, 1944, pp. 128, 9d.)

This is a most useful little book for psychologists, especially the chapter on "The Endocrine Organs." Professor Mottram writes with clarity and humour, and gives due place to the influence of psychological factors: he is far from dogmatic about the determination of human personality by physiological conditions. Other valuable chapters deal with "Mendelian Inheritance" and "The Determination of Sex." The book concludes with a useful glossary of physiological terms. The only fear is lest the supplies of this book should not meet the demand.

Invisible Anatomy—A Study of "Nerves," Hysteria and Sex: By E. GRAHAM HOWE, M.B., B.S., D.P.M. (Faber and Faber, Ltd., pp. 333, 10s. 6d.)

This book often seems little above the level of the advisory columns of the daily press. An idea of the treatment of its topic is given by chapter headings such as: A Storm at Sea, No Sex Appeal, Eternal Triangle, Scared to Death, This Woman Business. Diagrams intersperse rather than illuminate a text with many verbal curiosities; the mysticism of the east is dragged in to stop the gaps in the psychological knowledge of the west; bold arguments from spurious analogy and confident assertions give it some of the weaknesses of popular psychology. W.D.W.

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SYMPOSIUM ON PERSONALITY.[1]

I.—THE ASSESSMENT OF PERSONALITY.

BY CYRIL BURT.

I.—*Personality the Final Aim of Education.* II.—*The Assessment of Personality*: (*a*) *Analytic*; (*b*) *Synthetic.* III.—*Sources of Information*: (*a*) *Interviews*; (*b*) *Tests*; (*c*) *Standard Situations*; (*d*) *Reports.* IV.—*Results.* V.—*Summary and Conclusions.*

I.—'PERSONALITY THE FINAL AIM OF EDUCATION'[2]

PSYCHOLOGISTS who attempted to make a scientific study of individual differences began not unnaturally by devising methods for assessing the intellectual characteristics of the mind. In work with children this line of approach led rapidly to the discovery and standardisation of well-known tests of intelligence and of school attainments. The need for assessing temperament and character was by no means overlooked; but it soon became evident that the procedures which served for assessing cognitive capacities were quite inadequate for assessing emotional or moral qualities. For these, other devices have been invented and used by psychologists, but are, it would seem, comparatively unfamiliar. Indeed, many teachers and local education authorities appear to assume that the psychologist is concerned solely with mental testing, and that the rest of the human personality falls outside his province.

It cannot, therefore, be too emphatically or too frequently repeated that every leading teacher of psychology in this country—Bain, Ward, Stout, McDougall, and Myers—has again and again insisted that psychology deals with the whole of the human mind, and not merely with the intellectual processes; and those who have most strongly advocated the application of psychology to education, like Sully, Morgan, and Nunn, have been the first to urge the study of the entire personality of the child, and to assert their firm conviction that such a study must and can be carried out by scientific methods: experience and common sense do not suffice. Yet, strangely enough, in recent discussions on educational reform, apart from occasional references to graver defects of personality like neurosis and delinquency (which are supposed to be matters for a doctor), differences in temperamental outlook or in emotional interests are almost entirely ignored, and the normal child is discussed almost exclusively in terms of aptitudes or disabilities.

II.—THE ASSESSMENT OF PERSONALITY.

What, then, is personality, and how can it be studied? By personality I understand the entire system of relatively permanent tendencies, both physical and mental, that are distinctive of a given individual, and determine his characteristic adjustments to his material and social surroundings.[3] The use of the word 'tendency' is meant to indicate a

[1] *Editorial Note.* As the recent symposium on "Is the Doctrine of Instincts Dead?" was so widely appreciated, the Editor is glad to announce a symposium on Personality. The present article will be followed in the February number (1946) by a paper on "Personality in Problem Children" by Dr. Alan Maberly. In further numbers papers will appear by Professor Godfrey H. Thomson and by Professor G. W. Allport, whose book on Personality received such widespread notice.

[2] JAMES WARD: *Psychology applied to Education* (heading to last chapter).

[3] Cf. C. BURT: *Brit. Ass. Ann. Rep.* (1923), pp. 220f. The chief way in which my own account differs from that of later writers consists in the explicit inclusion of the physical aspect as well as the mental. To limit the word, as psychiatric writers appear to do, to the 'system of psychological factors' only, would seem to me to perpetuate the undesirable dichotomy between body and mind. Let me add that even a 'personality' is an abstraction: a child is not an isolated unit, to be diagnosed in and for himself like a patient in a consulting room. What the psychologist has to study are the interactions between a 'personality' and an 'environment'—the behaviour of a dynamic mind in a dynamic field of which it forms a part. Hence the complete scheme of inquiry must embrace a sociological study of the environment as well as a psychological study of the child.

frank acceptance of the 'hormic' or 'purposive'[1] standpoint. A tendency necessarily has a direction. It implies an end or goal: (the older word 'purpose' is perhaps best avoided, since it is likely to suggest that the 'goals' are necessarily conscious).

It follows that the psychologist has to consider three things: (i) the *goals* at which the individual is consciously or unconsciously aiming; (ii) the *energy*, i.e., the strength and persistence, with which each and all his goals are pursued; (iii) the *efficiency* of the mental mechanisms enabling the individual to guide his energy successfully in the directions required, in other words, the means available to pursue those ends. This tallies roughly, but not completely, with the familiar division of the mind into the three-fold aspects of affection, conation, and cognition. Since by definition personality consists of determining tendencies, it is essentially a dynamic concept. And since these tendencies may be acquired as well as innate, and even when innate may not necessarily be mature, it is evident that a child's personality is not completely fixed or absolutely permanent; it is a developing and an educable characteristic. Finally, though highly complex, it is nevertheless a more or less unified system, not a mere aggregate or sum.

Hence, to assess a child's 'personality,' it is essential to have a systematic and comprehensive scheme. This must be based on the best available knowledge about the structure and functioning of the mind, or rather of the whole individual organism. It must be a pragmatic or working scheme, elastic enough to be applicable to practical problems of every type, plastic enough to be modified or corrected as scientific knowledge increases.

However, on all essential points there is a growing measure of convergence among the various schools of psychology: their more recent representatives differ more in their terminology, their relative emphasis, and their restricted interests, than in their fundamental views on matters of fact. Consequently, it should not be difficult to draw up an eclectic system of concepts which can be scientifically defined and will be more or less acceptable to all psychologists of academic training.[2]

A.—Analysis. The central portion of the scheme will give what I have called a 'cross-section' of the personality—an analytic study of the child as he is now. The object of the psychologist, however, is not merely to describe each personality as he appears at the moment, but also to predict his behaviour in the future. Both aims will be fulfilled most effectively if the descriptions can be couched in terms of a relatively small number of key qualities, each of which is (so far as possible) independent of the rest, and each of which allows us to infer from it as many other dependent qualities as possible.

Such a group or cluster of interdependent characteristics can best be represented by a 'group factor.' The factor-measurements for different individuals will vary above and below the average; and those who show an extreme degree of variation in the same factor—i.e., persons possessing the trait-cluster in a supernormal or subnormal degree—will form what is loosely termed a 'type.' The complex pattern of extreme manifestations itself will constitute what the physician calls a 'syndrome.'[2]

The discovery of these key-qualities, like the discovery of key-elements in chemistry, is a matter for research. The notion that any philosopher or physician can write down a list from his own unanalysed experience, without any attempt at statistical verification, has been

[1] In spite of the criticisms, so frequently voiced by the newer schools of psychiatry, who complain that 'academic psychology' is too 'intellectualistic,' 'mechanistic,' 'static and statistical,' British psychology, especially in the field of education and of individual differences, has never surrendered its belief in the importance of teleological concepts. In America the temporary dominance of the older type of 'behaviourism' undoubtedly held back for a time a full appreciation of the fruitfulness of McDougall's standpoint for individual studies (cf. Murray *et al*, *Explorations in Personality*, p. 37): the success of more recent investigators, inspired very largely by the 'dynamic psychology' of Lewin, has produced a series of new techniques and researches eminently adapted to this type of approach. But many of these had already been foreshadowed over here in the earlier work of Garnett, Aveling, and McDougall's own pupils. Here the acceptance of 'ends' or 'goals' as a valid psychological concept had already led to a study, not only of unconscious purposes or wishes (instinctive and acquired), but also of conscious purposes and aims, i.e., of self-assigned standards or objectives—in short, of the individual's 'sentiments,' 'ideals,' or 'scale of values' (cf. *The Young Delinquent*, pp. 405f., 540f., and refs.)

[2] Cf. BURT: *Brit. Ass. Ann. Rep., loc. cit.*; and *The Subnormal Mind*, pp. 14f., where the theoretical bases of the scheme are more fully discussed.

responsible for the innumerable classifications found in semi-popular writings: *quot medici, tot opiniones*. From a scientific standpoint the problem is obviously one of correlation; and sufficient correlational data have now been accumulated to provide a good working outline of the main ' factors ' to be taken into account.

(1) First, we find that physical characteristics, though undeniably of causative and diagnostic importance, have far lower correlations with mental and temperamental characteristics than popular and medical psychology have commonly assumed. We may thus begin by regarding *physical* conditions and *mental* conditions as distinguishable, though not separable, factors.

(2) Secondly, certain tendencies appear to be highly correlated in members of the same family, even when brought up in different environments, while others are not. We are therefore justified in distinguishing between the factors of *nature* and *nurture*.[1]

(3) Thirdly, intellectual or *cognitive* traits tend to be correlated together, and emotional, i.e., *affective and conative*, traits tend to be correlated together, but each group shows but low correlations with the other. This yields a cross classification.

(*a*) About the cognitive factors there is now increasing agreement. Spearman's two-factor theory has given place to a three-factor. The former recognised only (i) a single *general* factor—g, as Spearman termed it (usually identified by other psychologists with innate intelligence) and (ii) innumerable highly *specific* factors, chiefly acquired and admittedly of little or no diagnostic importance. The three-factor theory recognizes, in addition (iii) a limited number of *group* factors or specialized aptitudes—the so-called 'general factor ' being really the most comprehensive of the ' group factors.'[2]

(*b*) About affective and conative factors far less is known, but the position is broadly very much the same. So far, there would seem to be a reasonable amount of evidence for the following factors, which are in all probability determined largely by innate constitution. (i) A general factor of emotionality : those who like physical analogies may identify this with amount of mental ' energy ' (or ' power '), since it is an ' undirected quantity.' (ii) Two or more bipolar factors, viz. : (a) a tendency towards introversion (in the sense of a bias towards inhibiting or repressive emotions) and its opposite ; (b) cheerfulness (or euphoria) and its opposite ; (c) possibly also a responsiveness to persons and its opposite. These contrasting tendencies form the ground of the common belief in ' temperamental types.' (iii) A number of still more specialized factors, falling within i, and classifiable and cross-classifiable under iia, b, and c. They are perhaps best defined by the consummatory states towards which they are directed (their ' ends ' or ' goals '). Being ' directed,' they may be regarded as mental ' forces.' Such ' directional dispositions ' or ' determining tendencies ' (to use the older phrase) it is now the fashion to call ' drives,' ' urges ' or ' needs.' Of these some are presumed to be ' basic ' or ' innate ' ; and, although the lists and names proposed differ widely, those most commonly enumerated bear a marked resemblance to McDougall's catalogue of human instincts.[3]

[1] This does not mean, as is so often supposed, that certain *modes of behaviour* are inborn and others are acquired. In books and articles on educational psychology the conception of ' nature ' as a source of individual differences is nearly always of an over-simplified, if not indeed of an obsolescent type. Strictly, ' nature ' should include at least three things : (i) hereditv, i.e., differences due to genetic constitution so far as that is directly derived from ancestry ; (ii) segregation, i.e., differences due to the chance combination and re-combination of genes (a process nearly always ignored in psychological discussions) ; (iii) mutation, i.e., changes in genes (a rarer process that may usually be ignored except where certain abnormalities are concerned). However, until human genetics have made further progress, our assessments of ' nature ' can consist of little more than predictive expectations based on statistical correlations ; but that is no reason for overlooking or belittling the influence of innate determinants.

[2] Cf. BURT : *Report on Psychological Tests of Educable Capacity* (1924), p. 19. My emphasis on group-factors (based on clinical as well as statistical evidence) was strongly criticised by Spearman (*Abilities of Man*, 1926, pp. 222, 241) ; Spearman's own hypothesis of a single general factor has been no less vigorously opposed by Kelley, Thurstone, and others. To-day, however, what I have called a three-factor theory would, I believe, be accepted by the majority of psychologists both in this country and America.

[3] Many educational and psychiatric writers in this country apparently believe that ' academic psychology ' in America is still antagonistic to the doctrine of human instincts and of purposive tendencies in general. Yet a glance at recent periodical literature will show that the pendulum is swinging back (see, e.g., *Psych. Rev.*, XLIV, pp. 352f. and refs., XLVI, p. 2, L, pp. 330f., 503f., etc.). At the Harvard Psychological Clinic, for example, H. A. Murray and his fellow workers, in their *Explorations of Personality* (1938), explicitly accept McDougall's ' able advocacy ' of ' dynamism,' and point out that their " classification of ' needs ' is not very different from the lists constructed by him " (*loc. cit.*, pp. 24, 69, 84, 90). Similarly, in spite of its novel terminology, the system of categories put forward in E. C. Tolman's *Purposive Behaviourism* could, in its broad outlines, readily be fitted to the scheme proposed above.

In studying both cognitive and conative tendencies, the degree of maturation and the effects of learning have to be considered in detail. This leads to the assessment of acquired characteristics. In the schoolroom, the assessment of acquired intellectual characteristics takes the form of standardised scholastic tests. The assessment of acquired conative characteristics has attracted less attention, possibly because on the conative side the distinction between the innate and the acquired is at once more difficult and less important. Broadly, we may say, the most important task is to examine how, as a result of each individual's experience, his primitive emotional tendencies have become organised into (i) complexes and (ii) sentiments. The psychologist will, therefore, note the chief persons, objects, and ideas which have thus become invested with strong emotional interest either pleasurable or the reverse, and more particularly the child's attitudes towards members of his family, school, and social group, his in-school and out-of-school pursuits and hobbies, his moral code and habits, his sense of values, and above all the nature and strength of his ' ego-sentiment.' The ego-sentiment may be regarded as determining both a sustained and general ego-ideal and the various ego-standards that are assigned by the self for each of its tasks. The former is qualitative, and must be stated primarily in words ; the latter, like other standards, can be assessed in quantitative form.[1]

B.—Synthesis. Since it is the ego-sentiment that eventually decides the place of all other sentiments in the general hierarchy, this brings us to the complementary line of approach. Academic psychology in this country has always maintained that a human personality is no mere "aggregate of habitual responses or traits," but (in McDougall's phrase) a " more or less harmonious and integrated whole." To determine the degree of integration—what Ward called the ' rank ' of a personality—we have to consider both the completeness of the unification and the range and variety of the motives and interests so unified. In a large population we can discover, as Ward himself points out, almost every stage of unification from what he describes as " the perfect personality that is one organic whole " down to the " psychological infantilism " of " les instables ou polymorphes."[2] One of the most important characteristics for the psychologist to assess, therefore, is the degree of stability or integration manifested by each personality. As I have suggested elsewhere,[3] we can roughly measure instability as the ratio of ' general emotionality ' to ' general intelligence,' or, in the adult, of disorganized complexes to organized sentiments : this gives us a kind of ' emotional age ' or ' E.Q.'

Such a rating, of course, yields only a vague and rough approximation. For a fuller understanding of each person we have to examine in detail how his basic emotional tendencies have been gradually consolidated into a stable and consistent pattern. Here, as Ward and his followers have contended, a genetic approach will provide the most valuable clues. Accordingly, we have to supplement our ' cross section ' of the personality by a ' vertical ' or ' longitudinal section '—tracing its various strands and roots as they have developed throughout the child's past history. In each case we shall want to know how the crude primary emotions have been differentiated or fused ; how the various instincts have been modified, repressed, or sublimated ; how different or antagonistic tendencies have been subordinated, or made to balance each other, or perhaps left in unresolved conflict ; in short, the modes in which, as well as the degree to which, the primitive impulses have been synthesised. For quantitative assessments, just as we use correlations between traits in our analytic investigations, so we can use correlations between persons (or of an actual person with an ideal type) to determine the mode of synthesis.

But once again we have to consider the environment as well as the child. The ways in which his common needs are satisfied, and his everyday behaviour articulated into more or less congruous habits of life, are largely taken over from the cultural and social frame of reference in which each one grows up. Yet much of it may be rejected or even reversed ; and the final outcome is unique for every individual. Hence, to convey a concrete notion of the resultant

[1] I have used ' ego-sentiment ' as a brief phrase for what McDougall termed the ' self-regarding sentiment.' My terms ' ego-ideal ' and ' ego-standards ' roughly correspond with what recent German writers have designated (rather awkwardly) the *Ich-niveau* and the *Anspruchs-niveaux*, respectively. Cf. Aveling on ' Ideals, Will and Character ' in *Directing Mental Energy*, pp. 206 *et seq.* The Freudian will probably prefer to express these distinctions in terms of the ' Super-Ego ' ; cf. Flugel's suggestive discussion in *Man, Morals and Society*, pp. 20f.

[2] WARD, J., *Principles of Psychology*, ch. XVII, XVIII, where the reader may discover many interesting and neglected anticipations of the views expressed in Allport's *Personality*.

[3] BURT, C. : ' The Unstable Child,' *Child Study*, X (1917), pp. 61-78.

temporal pattern, and to indicate its peculiar *Gestaltqualität*, our quantitative assessments, our profiles, and our psychograms, must be supplemented by a synoptic character-sketch, which calls quite as much for the imaginative insight of the artist as for the tabulated measurements of the scientist.

In conclusion, let us note that, throughout the whole investigation, the concepts required for case-descriptions are primarily *concepts of normal psychology, not of abnormal psychology*. Rare cases of suspected abnormality may require reference to a psychiatrist; but "the psychologist is, and always will be, the final judge of all questions pertaining to personality." (Murray, *loc. cit.*, p. 27).

III.—SOURCES OF INFORMATION.

To assess intellectual characteristics, psychologists have recourse to standardised tests; and the validity of such tests has itself been tested by correlating their results with independent assessments furnished by competent observers. So-called tests of personality are by no means lacking; but astonishingly little work has been done to determine how far we can really trust the estimates derived by these or other means.[1] In earlier publications I have reported my own experience with the various procedures available, together with a brief note of the kind of correlations obtained; and I promised,[2] when further data had been accumulated and analysed, to publish more detailed evidence on the methods found most effective during my work in L.C.C. schools.

In this paper I propose to summarise results obtained from an intensive study of 183 school children (65 boys and 118 girls) aged between 12·0 and 14·0. They are drawn from the series of cases examined during my investigations of delinquent, backward, neurotic, and supernormal pupils, and the parallel control-groups; they comprise all who were studied by the four main procedures described below and for whom I was subsequently able to procure fairly reliable criteria.[3] The various sources of information on which the assessments were based have been described in previous publications. Here, owing to limitations of space, I must confine myself to the briefest possible summary.

A.—Interview. In the present investigation the impressionistic ratings were based on the first interview only. The word must not suggest that the procedure resembles the ordinary type of interview with head teacher, psychiatric consultant, or potential employer. A definite technique was employed.

The child, at any rate to begin with, should not suspect that he is being interviewed at all. While 'waiting' he is brought into a room where a man is apparently engaged on 'putting away' some pictures, and is presently asked 'to help': (most children talk more freely when engaged on some semi-automatic task, which partly diverts their attention). He is asked no direct questions whatever until the later stages, but is encouraged to chatter frankly and intimately about his daily life. At the same time, despite an informal manner, the psychologist is working to a systematic scheme; he has a definite list of points on which he wants information, and his knowledge is gained quite as much by observing the child as by listening to his replies. It follows that the detailed technique of psychological interviewing is, or should be, itself the outcome of scientific research and systematic training.[4]

[1] See, for example, the reviewers' comments on the various tests, rating-scales, questionnaires, and inventories for 'character and personality' reported in *The* 1940 *Mental Measurements Yearbook*, pp. 49-100. "No direct measurement of validity for this scale" (or words to that effect) is the constant refrain for almost every one.

[2] *The Young Delinquent*, p. 412.

[3] I am particularly indebted to the numerous teachers who assisted (most of all the head mistresses of the Whittington School, Highgate, of Princess Road School and Manchester Street School, St. Pancras, where the largest groups were studied), to my personal assistants—Miss Pelham, Miss Woursell, Miss Charles, and Miss Bruce, and to numerous research-students, themselves often teachers, who undertook the study of special tests or aspects.

[4] One essential part of the training should consist in getting the student to calculate the validity of his own assessments, and to ascertain where and why his judgments are weak. This has the additional advantage of providing clear evidence as to the value of both the technique and the training. For sixty-three students (including teachers and medical men of experience, as well as students of education) I find that the average validity increased from 0·32 at the beginning of the course to 0·61 towards the close.

B.—Tests. Experimental devices for obtaining quantitative measurements of feeling or emotion are commonly divided into two main classes—(1) methods of 'expression,' and (2) methods of 'impression'; and these are not infrequently cross-classified into (a) the 'direct' and (b) the 'indirect.'[1] As I have suggested in earlier papers, it is convenient to adopt a corresponding classification for tests of temperament and character. The present account will be confined almost exclusively to the simpler kinds, such as have proved most useful for work in schools. These, it will be seen, depend mainly on the 'method of impression' and of 'indirect' assessment.[2]

Methods involving laboratory apparatus, such as the psycho-galvanic reaction or McDougall's dotting machine for measuring 'will power,' are not without their value. But for general purposes, as I concluded in my previous report, where we are seeking to test character and personality, "an indirect technique is far preferable to a direct; the moral test should be camouflaged, as it were, in the guise of a test of intelligence or information." The examinee, for example, supposes that he is being tested for observation, creative fancy, sense of humour, or artistic preferences: but, since his associations and apperceptions depend as much on emotional interest as upon his intellectual capacity or knowledge, these can be so evoked as to reveal his temperament and character rather than his abilities. When these principles are adopted, practically the only materials needed will be pictures, paper, and pencil.

1.—*Questionnaire.* The older 'personality questionnaire' was essentially a check-list of common symptoms; and few investigators seem to have realized that the 'indirect method' can be incorporated into the questionnaire as well. In accordance with the principles just cited, the questions should for the most part refer, not explicitly to the child's own characteristics (e.g., "Are you easily frightened?"), but to the characteristics of objects, persons, or situations, as viewed from the standpoint of the child: e.g., "Mark the things which frighten you least" . . . "Which do you think is most annoying, a (thing doing so and so) or a (person doing something or other)?" To obscure the primary purpose of the test, questions on objective matters-of-fact should be freely introduced, especially in the beginning; and the whole should be taken as a speed test.[3]

2.—*Autobiographical Sketches.* During ordinary periods for composition every child (together with the other pupils in his class) was asked to write on two topics: (a) 'What I should like to be doing in fifteen years' time'; (b) 'A history of my life.'

3.—*Completing a Story.* In early experiments[4] with Ebbinghaus' 'completion test' I pointed out that, whereas the completion of an argumentative passage furnishes a good test of reasoning ability and intelligence, the completion of an imaginative story depends largely upon the child's emotional interests and fantasy-life. Of the stories constructed for the present series, four dealt with *persons*: in each the chief characters represent two contrasted types—stable and unstable, aggressive and inhibited, etc.; and the hero (or heroine) is left open for the child to choose; his subsequent introspections show that the character so chosen is commonly the one with whom he more or less identifies himself. Six stories dealt with *situations*: these suggest some source of conflict or maladjustment in the personal life or social background of the hero; but once again the plot is vague enough to allow the child himself to determine its nature. (a) With one set the child is required to write a suitable termination; (b) with a second set an outline is provided (including indications for a dialogue between the chief characters) and the child has to fill in the gaps in accordance with Ebbinghaus' original procedure. The free completions were marked by much the same method as that used for marking the intellectual characteristics of children's compositions, viz., a schedule of the commoner 'pointers' or 'indicators,' with a code of symbols to be entered in the margin.[5]

4.—*Interpretation of Pictures.* In adapting the well-known picture tests from the Binet-Simon Scale for use with British children, we quickly found that the child's 'interpretations'

[1] For these distinctions, cf. Ruckmick, C.A., 'Psychology of Feeling and Emotion,' pp. 373-4, and, for their application to test-procedures, cf. Burt, *The Young Delinquent*, p. 404 and refs.

[2] *The Subnormal Mind*, pp. 325-335, and *The Young Delinquent* (1925), pp. 400-413 and refs.

[3] The majority of the topics covered will be found in the questionnaire printed in *The Subnormal Mind*, Appendix III, pp. 353-360; cf. also *The Young Delinquent*, p. 495.

[4] *J. Exp. Ped.*, I (1911), pp. 97-8. A similar observation has been made by one of Claparède's pupils, who has adapted the method for much the same purpose (M. Thomas, 'Méthode des histoires à compléter,' *Arch. de Psych.*, No. xvi). On the detection of psychoanalytic mechanisms in children's reconstructions of stories, see *Mental and Scholastic Tests*, pp. 279-381.

[5] *Mental and Scholastic Tests*, p. 331.

often threw as much light on his temperamental characteristics as on his general intelligence. To describe what is seen by the 'man looking out of a window,' the child has to imagine himself in the position of that person, and draw on his own memories or fantasies. Thus, as I have explained elsewhere,[1] by choosing suitable scenes, we can in effect "substitute pictures for actual situations," and elicit the child's reaction by what I have termed a 'camouflaged test': for, though the child seldom realizes it, the investigator is virtually asking—"how would *you* feel, act, or think in these conditions yourself?"

The test was given in two forms—free and controlled. (a) In the first, the child was shown six 'problem pictures,' and required to suggest a title and explain what is happening; (b) in the second, he was given eight such pictures and an outline for each, with alternative suggestions for the crucial words, and was required to underline those he prefers. A fortnight later he was asked to pick out, from a set of twenty pictures, the fourteen he had seen.

5.—*Apperception of Ambiguous Pictures or Words.* In the article just quoted I also described a more direct attempt to exploit the principle of apperception for eliciting emotional and temperamental differences. Puzzle pictures, each consisting of two representations superposed or otherwise combined, were exhibited for a brief instant, so that only one of two alternatives would be noticed: (Dana Gibson's well-known puzzle-picture, 'The Skull,' illustrates the principle). Then, as I reported, "the particular mode of apperception often shows consistent and significant differences."[2] In the present series twenty pictures and twenty words were used—one alternative appealing to one type of emotion or interest, the other to another or to some unemotional topic.

6.—*Apperception of Blots.* (a) Much the same principle is applied in the well-known Rorschach blot tests.[3] With these, in addition to Rorschach's own method of scoring, an endeavour was made to mark the results so as to yield measures for the chief temperamental qualities. (b) Artificial 'blots' were also used, each suggesting only two or three interpretations; and the child was required to underline the one that seemed most appropriate.

7.—*Ranking Pictures.* For this test two series of thirty pictures have been selected so as to appeal to definite emotions. The child is asked to rank them in order of preference. To conceal the real intention (a) the first set is presented as a test of artistic appreciation, (b) the second as a test of humour. The correlation of the child's order with the average can be used as a measure of these capacities; and the deviations are taken to indicate his emotional tendencies (*loc. cit.*, p. 27).

8.—*Free Association*: (*Discontinuous Method*). A standard word-list for English children should be used: those of Kent and Rosanoff or Jung are not suited to English verbal habits. In this inquiry we used (i) the starred words in the Appendix to *The Subnormal Mind* (pp. 363-5, 2nd ed. and (ii) Moore's list for assessing special instincts (cf. *The Young Delinquent*, p. 401 and ref.). Suggestive words, taken from the child's own compositions, etc., were also occasionally inserted.

9.—*Moral Tests.* To study what I have called the 'ego-ideal' descriptions of (a) persons and (b) actions were given to the child, and he was asked to rank them according to his moral approval; (c) brief descriptions of situations with alternative reactions or attitudes (four for each) were also given to him to mark, and here he was asked to underline the reactions with which he agreed most and least. To study his 'ego-standards' more active tasks were used. (d) With the earlier groups we tried the well-known 'will-temperament tests' of June Downey: these seek to assess such qualities as persistence, self-confidence, ability to increase or adapt speed of working, to make decisions, etc., by measuring speed of handwriting and its modifiability under various assigned conditions. (e) With later groups we tried a 'willed assignment test,' by modifying the foregoing so that the child himself decides the speed at which he shall aim.

[1] See *Subnormal Mind* p. 326. The experiments were commenced with Binet's three test pictures, 'The Boyhood of Raleigh' (Millais), 'Death of Chatterton' (Wallis), 'Hope' (Watts), 'Toteninsel' (Boecklin), 'Composition' (Salvador Dali), 'A Hopeless Dawn' (Bramley), 'When did you last see your Father?' (Yeames), 'What shall he be when he's grown up?' (Newcome), 'and' She looked at me through the half-open door' (magazine illustration). Later, Miss Charleston, who was largely responsible for this part of the work, re-drew the pictures in the light of the experience gained, and added others largely suggested by illustrations from children's adventure-stories and thrillers.

[2] "Mental Differences between the Sexes: (B) Emotional Activities," *J. Exp. Ped.*, I (1912), p. 147. The apperception of ambiguous sounds (muffled words, etc.) was not so effective with children as with adults.

[3] Cf. M. Kerr, 'The Rorschach Test applied to Children,' *Brit. J. Psychol.*, XXV (1935), pp. 170f., and for procedure, B. Klopfer and D. M. Kelley, *The Rorschach Technique* (Harrap, 1939).

The same principle was subsequently extended to tests of arithmetic and reading, as well as handwriting, adopting a technique closely akin to that employed with adults by J. D. Frank in experiments on 'levels of aspiration.'[1]

After all the tests had been completed, the child's replies were discussed with him; and an effort was made to verify the processes involved by eliciting introspections.[2]

C.—Observation in Standardised Natural Situations. There is one psychological maxim with which every teacher is now familiar: "no one should expect to improve a child's ability to do one thing by practising him at doing something different." But there is a second which ought no less to be taken to heart: "no one should expect to discover how a child will behave in one situation by watching his behaviour in a different situation." Hence, as I have argued more than once,[3] to discover what are the dominant motives in a child's everyday activities, the only safe method is to observe him under conditions that are as *lifelike* and as *varied* as possible.

What I have said applied equally to interviewing and to temperamental tests. To the child the ordinary 'psychiatric interview' is a very unnatural ordeal: and his conduct in the doctor's consulting room may yield no clue whatever as to his behaviour at home or in the street, or with persons of his own age or class. Similarly there is an unrecognised difference between a paper test for intelligence and a paper test for emotional reactions: the former constitutes quite a natural stimulus for evoking the quality it is meant to test; but the latter does *not* furnish a natural stimulus for anger, cheerfulness, affection, and the like.

In the ordinary day school the teacher has little opportunity for observing the latent motives that are nevertheless in constant operation, determining the child's attitude towards work. As I have argued elsewhere, one of the great advantages the psychologist sees in freer classroom conditions (e.g., those of the so-called Dalton plan) are that they enable the teacher to observe the implicit ideals and the implicit standards that are determining the child's rate and accuracy of working, for then the child largely 'wills his own assignments,' i.e. (in the more recent phrase) decides his own 'level of aspiration.' For the psychologist, dealing with special cases, the ideal procedure is to live with the children for a few days in a residential home run on free lines. This was in fact carried out with a smaller number of the delinquent cases. But for the majority of those in the present group, two substitutes were employed.

(i) Each child was invited to a 'tea party,' a 'treasure-hunt' in a park, and a visit to the Zoo. On these occasions a number of stock little crises were stage-managed, so that each child's reactions to typical everyday emergencies could be observed.

(ii) With children one of the most natural situations of all is playing with other children. Events in such games he takes as seriously as events of real life, and he feels less self-conscious or self-critical. Accordingly, each child spent some time with an assistant in a playroom; and to standardise conditions there was one 'game'[4] in which all were encouraged to take part.

D.—Reports. For every case as full a report as possible was obtained from school, parents, and home visitors. These reports, which in the present experiments were not examined until after the psychologist's preliminary studies were completed, were used as

[1] *The Young Delinquent*, pp. 403-412 and refs. June E. Downey, *Will-Temperament and its Testing* (Harrap, 1923). J. D. Frank, *Am. J. Psych.*, XLV (1935), p. 121: with students a similar technique was used with McDougall's well-known test for measuring 'will power' (irregular dotting), but this proved unsuitable for children. The study of tests for moral qualitites was chiefly undertaken in collaboration with Miss K. N. Roberts, who, I hope, will shortly publish further details; cf. also S. Bramachari, *Moral Attitudes and Personal Adjustment* (degree thesis, 1937). In the original programme the more familiar methods of testing 'perseveration,' 'oscillation,' and 'fluency' were also included, but were eventually dropped, because the inter-correlations were too low to confirm the existence of so-called 'p-,' 'o-' and 'f-factors.'

[2] The phrase 'projection test' has recently come into use to designate tests such as those described above: (for an attempt to define the phrase, see H. Sargent, *Psych. Mon.*, LVII, 1944). However, I suggest that the label should be kept for those particular tests where introspection has definitely demonstrated a process of 'projection' in the technical sense.

[3] *The Young Delinquent*, pp. 417f.

[4] Called "Making a Sea-Side Farm"; but with the older children this was treated, not as a game, but as a serious effort at planning with the aid of models. The materials were those of the ordinary infants' school playroom, with dolls that would stand unsupported to represent the chief characters. In all these 'standardised situations' a regular schedule was used for recording observations. Similar methods were also adopted in parallel investigations with students, who were studied under holiday conditions: see *Character and Personality*, VII (1939), 'A Factorial Analysis of Emotional Traits.'

the basis for the criteria by which the accuracy of the psychological assessments were judged.

Ordinarily the form of the report on individual pupils is left almost entirely to the person reporting; but this may deprive the recipient of three-quarters of the information that the writer possesses, and limit the remainder to specific complaints or a vague testimonial. Accordingly, our practice has been to submit an explicit questionnaire, including a request for ratings on definite traits, supplementary comments, and if possible a pen-picture. The particular points on which information was sought are fully indicated in the books already quoted (cf. *The Backward Child*, pp. 67-72, 630f.).

IV.—RESULTS.

Criteria. In every attempt to evaluate methods of assessing temperament and character, the great difficulty is to secure independent estimates sufficiently trustworthy to serve as criteria. When validating tests of intellectual capacities we rely mainly on teachers' reports; but for traits of personality and character teachers' judgments of their pupils are in general far less reliable than for intelligence and school attainments.[1] As a result, in the present inquiry it was necessary to reject a large number of the cases studied, especially among the boys, simply because the teachers' ratings were too doubtful to be used. For the remainder the teachers' judgments have, so far as possible, been carefully re-checked by a fuller acquaintance with the children, in school, out of school, and after they had left. As I lived for several years in the districts from which the three main schools recruited their pupils, it was possible for me to remain in touch, directly or indirectly, with the majority of the cases here included. I may add that a comparison of the after-histories with many of the case-descriptions supplied years before by teachers who possessed some knowledge of psychological procedure, has convinced me that a teacher so trained may make by far the best judge of the personalities of his own pupils. Here I can only give a brief epitome of the main results.[2]

A.—Correlations. After each stage of the procedure here described—interview, tests, and standard situations—separate assessments were made for every child. In this way it was hoped to estimate the validity not only of the procedure as a whole, but also of its various components. The correlations between these assessments and the criterion-ratings were then worked out for the several groups, and averaged. The figures obtained with the more reliable trait-ratings are shown in Table I. Coefficients over ·15 are statistically significant.

TABLE I.

CORRELATIONS BETWEEN ASSESSMENTS AND CRITERION RATINGS FOR SPECIFIC CHARACTERISTICS.

Trait.	(i) Interviews.	(ii) Tests.	(iii) Standard Situations (a) Actual.	(iii) Standard Situations (b) Play.	(iv) All Three Methods.
General Emotionality	·61	·51	·63	·40	·74
General Stability	·53	·32	·64	·35	·68
Extraversion	·43	·28	·59	·42	·67
Cheerfulness	·59	·06	·61	·36	·69
Sociability	·57	·18	·65	·33	·73
Leadership	·33	·29	·66	·28	·70
Anger	·13	·09	·53	·35	·54
Timidity	·63	·43	·62	·38	·78
Industry	·28	·25	·26	·32	·46
Neurotic Tendencies	·55	·45	·33	·25	·61
Delinquent Tendencies ..	·23	·13	·34	·17	·35
Average	·44	·27	·54	·33	·63

[1] Cf. BURT: 'The Reliability of Teachers' Assessments of their Pupils,' this *Journal*, XV (1945), p. 83.

[2] I hope eventually to publish fuller details in the third volume of the series on 'The Subnormal School-Child,' dealing with deviations in personality and character.

From Table I three main conclusions emerge. (i) Assessments based on all three methods are far more accurate than those based on any one. (ii) Except for neurotic tendencies and industry, assessments based on actual situations are far more trustworthy than those derived from either interview or tests. And (iii) except for general emotionality, neurotic tendencies, and timidity, quantitative assessments based on the tests appear to have little or no practical value by themselves.

As regards the interview, what I have said of older children holds also of this group.[1] Simple emotional qualities are easier to assess than moral qualities; and those excited by persons, especially by the interviewer, are easier to assess than other emotional qualities, for in an interview, emotions excited by older persons, like shyness and timidity, are naturally more likely to be observed than those excited by other children, like dominance or leadership. It was also found that, when a second estimate is obtained from an independent observer, and the results then pooled or readjusted in conference, both the reliability and the validity are considerably enhanced (by about 30 per cent. and 17 per cent. respectively: there is a similar improvement when two or more observers watch the child's behaviour in standard situations).

As regards individual tests, I have indicated in previous publications the general range of the reliability and validity coefficients, and the chief inferences to be drawn. More detailed analyses will, I hope, be published by research workers who have made an intensive study of particular procedures. Here, to illustrate the main results, I have taken the criterion-ratings for 'general emotionality' (which form on the whole the most reliable series), and have correlated them with the assessments derived from each test. Since most of the tests had been applied twice (usually with slightly different material and with somewhat smaller groups), reliability coefficients can be calculated as well. The results are given in Table II.

TABLE II.

RELIABILITY AND VALIDITY OF RATINGS BASED ON TESTS.

Test.	Reliability.	Validity.
(i) FOR GENERAL EMOTIONALITY:		
Questionnaire	·71	·47
Autobiographies	—	·29
Completing a Story:		
(a) Free	·46	·23
(b) Controlled	·58	·32
Interpretation of Pictures:		
(a) Free	—	·38
(b) Controlled	·57	·22
Apperception of Ambiguous Pictures	—	·16
Apperception of Ambiguous Words	—	·12
Apperception of Blots:		
(a) Artificial	·41	·21
(b) Rorschach	—	·18
Ranking Pictures:		
(a) Artistic	·39	·21
(b) Humorous	·43	·26
Free Association:		
(a) First List	·66	·24
(b) Second List	—	·08
(ii) FOR MORAL QUALITIES:		
Ranking Actions	·37	·22
Ranking Persons	·55	·26
Ranking Attitudes	·44	·20
Will Temperament	·36	·13
Willed Assignments	·53	·31

Of all the tests here used, the Questionnaire appears to have the highest reliability and validity. In experiments on vocational guidance with older children and with adults, it may be remembered, this test proved by far the best; e.g., adopting a fairly high borderline, we found that those selected on the basis of abnormal responses generally included 70 to 80 per cent. of

[1] BURT, C., *et al.*, *A Study in Vocational Guidance* (H.M. Stationery Office, 1926), pp. 63f.

the unstable or neurotic cases (together with a number of relatively normal persons). With children of school age the agreement is not so high (63 per cent. only); but this test still seems to provide by far the best procedure for collecting preliminary general impressions with a minimum expenditure of time. Of the remainder Free Interpretation of Pictures and Controlled Completion of a Story appear the most promising. With the more intelligent pupils, free composition was decidedly more effective than underlining suggested alternatives; with the less intelligent the latter seemed the better method. For assessing general emotionality the Apperception tests are apparently useless; but for extra-version (·31), fear (·34), and sex (·41), they yield somewhat higher correlations. With Free Association, the number of 'complex-symptoms' (chiefly prolonged reaction-times) were counted for each child: and with my own word-list the figures gave a moderate correlation with neurotic tendencies (·35); prolongations over words suggestive of sex complexes gave a still higher correlation with sex (·38). Moore's list (as stated in my previous report) proved to be of little value. Of the tests used to estimate general moral character, 'Ranking Persons' would seem to be the best for this particular purpose. Quite apart from its low correlation with general moral character, the 'Will Temperament' test proved both unreliable and uninformative; the 'Willed Assignments' test seemed far more promising, but the technique leaves considerable room for improvement and research.[1]

However, from time to time, most of the tests employed threw a revealing gleam on some particular child, and furnished useful starting-points for informative discussions. In this respect Ranking Pictures proved on the whole the most suggestive, probably because of the wide variety of material included; but Free Interpretation of Pictures, Free Completion of a Story, Willed Assignments and above all the familiar test of Free Association, were also valuable for more intensive individual studies, especially with the nervous type of child.

The main inference to be drawn I have already stated elsewhere. "For the examination of the normal temperament, there is hardly a single test simple enough and reliable enough to be used for practical work; on the other hand, with neurotic cases, certain somewhat novel tests, which show little significant variation within the normal range, nevertheless yield promising results when used for detecting the more extreme abnormalities."[2]

B.—Matching Coefficients. It may be argued that methods of assessing personality should be judged, not by the quantitative assessments they may yield for isolated traits, but for the insight they afford into each complex personality taken as a whole. In the hope of meeting this criticism, the following procedure was adopted. On the basis of each of the three main procedures, a short character-sketch or case-description was attempted for every child, and then a final composite sketch was drawn up, based on all three sets of data, by those who examined the child, meeting together in conference. The descriptions were submitted in groups of 8 to 12 to a teacher who knew all the children in a group; and a list of names was supplied separately. The teacher (or teachers if several knew the children) was then asked to fit the right names to each case-description. The amount of agreement was measured by a 'matching coefficient,' i.e., an index-figure analogous to a

[1] With this the most interesting result was the division of pupils into three broad groups reminiscent of the old division of moral philosophers into idealists, realists, and hedonists. The young idealists are over-confident or over-conscientious workers whose aim is well above their reach; the young hedonists are either diffident creatures with an *inferiority complex* or idlers whose aim is set well below their powers; the realists are cooler and more stable youngsters who either have a clear insight into their own capacities or quickly learn by experience what they can or cannot do. A preliminary factor analysis by Miss K. N. Roberts (who collaborated in this part of the work) suggests that the same type of attitude is generally (but by no means always) common to all forms of school work tested in this way. The tendency towards low or lofty 'aspirations' is easily discernible in 'standard situations' and, of course, in real life.

> "This high man aiming at a million, misses a unit:
> That low man adding one to one, his hundred's soon hit;
> That sure man seeks a little thing to do, sees it and does it."
>
> (BROWNING, *A Grammarian's Funeral*).

[2] *The Subnormal Mind*, p. 325. As already mentioned, laboratory tests are not discussed in this paper. I may add, however, that with two small groups of children promising results were obtained with the psychogalvanic response: with general emotionality and neurotic tendencies the correlations were over ·60. The measurement of blood pressure and (with a very small group) basal metabolism gave far lower correlations with children than with students.

coefficient of correlation.[1] There were five groups, each from a different school or class, and fifty-three children in all.

To obtain some basis of comparison similar character-sketches were procured for five groups of children (not always the same children as before) from teachers who had known them in a previous class or school. The sketches were submitted for matching (a) to the group's present teacher, and (b) to me, after I had made some study of the children. In all cases, irrelevant items that might facilitate direct identification—such as references to delinquencies, special symptoms, educational disabilities, or level of intelligence—were omitted. The figures given in Table III are averages of the coefficients for the separate groups.

TABLE III.

IDENTIFICATION OF CHARACTER SKETCHES.

Basis.	Matching Coefficients.		
	For Boys.	For Girls.	Average.
i Interviews	·42	·46	·44
ii Tests	·22	·28	·25
iii Standard Situations: ..			
(a) Actual	·55	·49	·52
(b) Play	·37	·29	·33
iv Three Methods Combined	·63	·71	·67
v Teachers' Character Sketches:			
(a) Judged by Other Teachers	·06	·18	·12
(b) Judged by Psychologist	·12	·27	·19

It would perhaps be rather rash to attribute the differences between the figures exclusively to differences between the procedures. But two or three conclusions may, I think, be safely drawn. With both boys and girls the final character-sketches based on all three methods prove far easier to identify than those based on a single method of study alone. Of all the single methods, the best, particularly for the boys, consists in observations made during actual situations. By themselves tests and play-situations do not provide sufficient material for a complete character-sketch; nevertheless they may contribute important supplementary points, and so raise the value of the combined procedure. On the whole, it appears somewhat easier to produce recognisable character-sketches for girls than for boys. So far as the relevant figures can be trusted, it would seem that the poorest of the psychologist's devices—the simple test-procedure—yields a better picture than the spontaneous character-sketches of the unaided teacher; but even the best of these particular coefficients were barely significant. On the other hand, the combination of all three methods gave a highly encouraging result (·67).

It is instructive to note the commoner reasons why the teachers' own character-sketches prove so hard to recognise. First, their descriptions are not sufficiently systematic or comprehensive: as a rule only a few salient points are noted for each child, and the features differ for different children, so that comparison is exceptionally difficult. Thus the psychologist's synthetic picture would seem to owe its value largely to the fact that it is based on a prior analytic study. Secondly, the words and phrases used by teachers are exceedingly vague and ambiguous, and each teacher tends to use a vocabulary of his own. Indeed, it is usually easier to identify the teacher making the report than to identify the child on whom he is reporting. Later, several of the teachers were good enough to fill in a questionnaire for the same children: the coefficients then rose to ·23 and ·37.

I have calculated similar coefficients for cases which for various reasons I have been forced to study alone. For these the coefficient is only ·49, as contrasted with ·67, for cases in which there were at least two collaborators. There appear to be several reasons for the improvement. First, the behaviour of every child varies with different individuals, especially when they

[1] For methods of calculation see Appendix below. As there implied, this procedure has been found particularly useful in attempting to validate the reports and type-classifications suggested by psychiatrists, who, with some justice, argue that their ultimate findings hardly lend themselves to the ordinary correlation technique. In Table III any coefficient over ·28 can be taken as statistically significant.

differ in sex. Secondly, the child's mood and behaviour vary from day to day and even from hour to hour: in many cases behaviour at the first interview of all is apt to be something of a shock-reaction, and on a second visit the child may seem quite a different person. Thirdly, different investigators have different training, experience, and viewpoints: usually they had been asked to concentrate on different aspects of the case; but whether this is so or not, their interests differ, and they observe as well as elicit different reactions. Finally, when they meet together for consultation, the joint discussion helps to correct or amplify the impressions gleaned by each worker in isolation.

V.—SUMMARY AND CONCLUSIONS.

1.—The study of an individual's personality should follow a systematic but elastic scheme, based upon an eclectic interpretation of the current doctrines of academic psychology. The view of personality as a dynamic, integrated, purposive whole, generally accepted in this country since the days of Ward and McDougall, lends itself admirably to practical work. The adoption of such a scheme of study, involving a well-chosen and carefully defined set of scientific terms and headings, and comprising both an analytic and a synthetic approach, may nearly double the accuracy of the investigators' judgments.

2.—The final summary of each case should include (a) quantitative ratings for the chief key-qualities or 'factors,' thus providing an analytic description of the child in terms of a standardised scale or set of diagrammatic profiles, and (b) a qualitative character-sketch, giving a synthetic picture of his total personality in words. The accuracy of the quantitative assessments can be measured by the ordinary product moment correlation; that of the character sketches by a correlation coefficient based on a matching procedure.

3.—Both the reliability and the validity of personality judgments are appreciably increased if more than one investigator studies each case. The investigators should work independently, and report their findings before consultation, but join in a case-conference at the close. The dominant partners in the team should be an educational psychologist (the same for all cases) and the child's own teacher.

4.—The general procedure should consist in a combination of different methods of approach, and not rely on a single method only. Four main sources of information should be available for all cases, and be given their due and different weights: viz., (i) tests (of a picture, paper, and pencil type rather than instrumental); (ii) interviews (personal examinations, informal but systematic, with at least two sessions for every case); (iii) observations of the child's behaviour in a series of standardised real-life situations (in my view by far the most important feature of the plan); (iv) reports on past behaviour, home circumstances, mental development, etc., from teachers, social workers, parents, etc., including reports of medical inspections. If the psychologist has been adequately trained, reference to an outside specialist—e.g., a psychiatrist—should be necessary only in a comparatively small number of cases, i.e., those in which some pathological disorder is suspected.

5.—Assessments based on the combined approach have a far higher validity than those based on one type of procedure only. The current notions that a child's personality can be summed up in a half-hour interview in school, or an hour's session in a psychiatrist's consulting room, or even a couple of hours' formal testing, is quite erroneous. To judge temperament and character it is desirable that he should be watched in natural but controlled situations, and for part of the time in the company of other children.

6.—In general the interview is at once more informative and more trustworthy than the tests, the reports (when sent in by competent and interested observers) than the interview, and the observations under standardised real-life conditions better still. The final synthetic character sketch gains greatly in accuracy and value when based on a prior analytic study.

7.—The value of quantitative assessments derived from formal temperamental tests has been much over-estimated, largely owing to the practice of not publishing adequate validation-data. Broadly speaking, their reliability coefficients are barely two-thirds,

and their validity coefficients less than one half, those usually obtained with standardised tests of cognitive abilities and attainments. Their chief service is to assist (a) in the preliminary screening, (b) in standardising ratings by different investigators, and (c) above all in eliciting useful starting points to be followed up in the interview. On the whole, the Questionnaire appears to be the most effective of the written tests, Ranking Pictures of the individual tests. Some of the newer techniques (e.g., those involving free or self-imposed assignments) throw special light on classroom problems, but require further research before they can be recommended for practical use.

8.—Interviewing and observing require a knowledge of techniques quite as much as mental testing. The success of the observer depends partly on personal aptitude, partly on practical experience, but most of all on adequate training. The technical points for which training is more especially needed include a knowledge of the chief traits, tendencies, and types to be noted, their technical names and definitions, their symptoms and syndromes, the use of rating-scales, the construction of scientific reports (including character-sketches), in short, a knowledge of what to look for and how to elicit and describe it, and, last but not least, the validation of the different procedures used and of the observer's own judgments.

APPENDIX ON MATCHING COEFFICIENTS.

The possibility of validating assessments of personality by statistical procedures has of late been frequently questioned, particularly by clinical investigators at child guidance centres, on the ground that "quantitative techniques inevitably disrupt the total personality."[1] Thus psychiatric writers commonly expect their diagnoses, descriptions, or type-classifications of children to be accepted without validation: every competent psychiatrist, it is implied, would accept their descriptions, but "the agreement cannot be statistically tested, because the assessments are qualitative not quantitative": they refer "not to simple isolated traits, but to the child's complex personality as a whole."

Nevertheless, statistical tests are by no means difficult to devise.

(A) We need first a test of *significance*. Let us begin with the problem in its most general form. To keep it concrete, let us suppose that N children have been independently examined by two psychiatrists at a clinic, and that Dr. A diagnoses or classifies them as belonging to one of k types—'hysteroid,' 'paranoid,' 'schizoid,' 'cycloid,' 'autistic,' etc.: he places $n_1, n_2, \ldots n_k$ in each class. Dr. B makes his diagnoses independently, and places $m_1, m_2, \ldots m_k$ in each class. We cannot expect *perfect* agreement; on the other hand, even with purely random classifications, there would usually be a small number of instances in which the diagnoses would coincide. Now let x denote the actual number of cases in which the two diagnoses 'match.' If this exceeds the number expected by sheer chance ($\bar{x}$) by more than twice the standard deviation (σ), then we may infer that there is at least some degree of significant agreement.

Thus stated, we have a problem that is quite familiar in the history of probability.[2] The solutions are as follows:

$$\text{Mean } (\bar{x}) = \frac{1}{N^2} \Sigma n_i m_i \quad (i = 1, 2, \ldots k) \qquad \ldots \qquad \ldots \qquad \ldots \qquad (1)$$

$$\text{Variance } (\sigma^2) = \frac{1}{N-1} \left\{ \Sigma n_i m_i - \frac{1}{N} \Sigma n_i m_i (n_i + m_i) + \frac{1}{N^2} (\Sigma n_i m_i)^2 \right\} \qquad \ldots \qquad (2)$$

[1] The most recent statement of this view is to be found in Blackburn's book on *Psychology and the Social Pattern* (1945), p. 85. I may add that the example used is quoted from my L.C.C. work, where this procedure was adopted to compare reports on the same children by myself and by one of the school medical officers (to whom I am much indebted for co-operation). The classification of personality types according to the chief mental disorders is that of Rosanoff: very similar schemes have been employed by Humm, Wadsworth, Bowlby and other child guidance workers.

[2] The problem (usually known as the 'game of *recontre*' or coincidences) was discussed by N. Bernouilli, De Moivre, Laplace, and others. In psychology the use of a matching procedure developed out of experiments by Binet and others on the possibility of identifying handwritings. The formulæ usually adopted for testing significance are based on Laplace's solution. In the few cases where attempts are made to measure efficiency, the contingency coefficient has generally been used; but this does not vary between 0 and 1, and in its usual form measures consistency (or 'reliability') rather than efficiency (or 'validity').

If we wish to test B's efficiency by taking A's diagnoses as the criterion, it would be best to give him an equal number of each type: so that $n_1 = \ldots = n_k = n = N/k$. Then, if B is unaware of this,

$$\bar{x} = n = N/k \quad .. \quad .. \quad .. \quad .. \quad .. \quad (3)$$

$$\sigma^2 = \frac{n(N^2 - \Sigma m^2)}{N(N-1)} \quad .. \quad .. \quad .. \quad .. \quad .. \quad (4)$$

If, however, B also distributes his cases equally,

$$\sigma^2 = \frac{N^2(k-1)}{k^2(N-1)} = N/k \text{ (approx)} \quad .. \quad .. \quad .. \quad (5)$$

Finally, if each child is regarded as forming a unique class of one, all by himself, then, whatever the value of N, the number of chance matches will be

$$\bar{x} = 1,$$

$$\text{and } \sigma^2 = 1:$$

so that the frequency-curve takes the familiar Poisson form. (A graph of the curve is given in Fig. 10.4, Yule and Kendall, *Introd. Theory of Statistics*, p. 190, from which it will be seen that, whatever the number of children, four correct matches are fully significant and three barely so.)

(B) To measure the *efficiency* of B's judgments, we want a coefficient which, like a coefficient of correlation, will vary from 0 to ± 1, and obey other well-known requirements. We can treat the problem as one of 'correlation between persons' (viz. between A and B).

(1) If we assume (i) that the children can be arranged in order of similarity and (ii) that the incorrect matches are distributed by chance, we have

$$r = 1 - \frac{d(d^2-1)}{N(N^2-1)} \quad .. \quad .. \quad .. \quad .. \quad .. \quad (6)$$

where d = the number of discrepancies (incorrect matches). But the second assumption (ii) seems rather doubtful.

(2) A better formula is reached if we regard r as a ratio of standard deviations. We then obtain

$$r = \sqrt{\frac{c-1}{N-1}} \quad .. \quad .. \quad .. \quad .. \quad .. \quad (7)$$

where $c = N - d$ = number of correct matches. This is the formula used in the text; σ_r may be taken as $1/\sqrt{N-1}$.

AN ANALYSIS OF YOUTH CENTRE INTERESTS.

By W. H. HAMMOND.

I.—*The problem.* II.—*Data.* III.—*The analysis and resulting factors.* IV.—*The problem of attendance.* V.—*Summary and conclusions.*

I.—The problem.

The following preliminary enquiry seeks to throw light on the most popular interests manifested by those who attend youth centres, and reveals the importance of considering the existence of different types. The investigation was carried out at the Holystone Youth Centre, Hebburn-on-Tyne. An incidental point of interest was to discover whether the information obtained at the time of the enrolment would give any indication why some of the members ceased to attend the Centre whilst others remained.

II.—Data.

The enrolment form gives space for name, address, age, sex, occupation, and, in addition, it contains a list of activities which the entrants tick or cross according to whether they are interested in them or not. At the time of the investigation (Autumn, 1941, when Holystone Centre had just been opened), 146 members had filled in enrolment forms. Six of the forms, however, were not completed properly. Hence 140 remained as the object of the study. Of the entrants, seventy-four were boys (mean age, 16·2 years) and sixty-six girls (mean age, 16·3 years). From the forms we can discover which are the most popular interests of the group of adolescents. But we cannot necessarily suppose that this order also indicates the strongest incentives causing members to enrol, since we have no comparable data for the frequency of interest of those who do not enrol.

III.—The analysis and its results.

The order of popularity of the activities, expressed as the percentage of the whole group claiming interest in them, is given in Table I.

TABLE 1.

	Boys.	*Girls.*	*Staying Group (4 or more attendances).*	*Leaving Group (less than 4 attendances).*	*Total.*
Table Tennis	85	95	90	90	90
Darts	84	61	74	71	73
Billiards	81	11	45	52	48
Cycling	78	80	81	77	79
Dancing	74	91	81	83	82
Swimming	73	82	78	75	77
Physical Training	73	67	69	71	70
Camping	73	80	76	77	77
Quiet Games	57	58	58	56	57
'Keep Fit'	50	74	64	58	62
Rambling	49	82	65	63	64
Reading	32	42	39	35	37
Discussion	31	41	36	35	36
Dramatics	28	76	46	59	51
Hobbies	27	36	27	38	31
Netball	11	82	43	46	44
Mean Frequency[1]	58	69	63	63	63
Mean number of interests	8·1	9·7	8·8	8·9	8·9

[1] Excluding billiards and netball as being unrepresentative.

The high level of the frequencies from 90 per cent. (interest in table tennis) to just over 30 per cent. (interest in hobbies) indicates a generally widespread interest. As might be expected, the essentially active and social interests head the list; the more intellectual and individual ones are much less popular. The low position of billiards and netball can be explained by the fact that they are almost confined to one sex, e g., 81 per cent of the boys and only 11 per cent. of the girls expressed interest in billiards whilst 82 per cent. of the girls and only 11 per cent. of the boys expressed interest in netball. Many of the entrants regarded 'physical training' and 'keep-fit' as applicable only to boys or girls respectively, although some ticked both. It would have been preferable either to include both under one heading or to make it clear that they were to be regarded as the alternatives for the sexes. The first difference between the sexes is that the frequencies (or mean number of interests) are somewhat higher for the girls than for the boys. Secondly, the order of preference is different. As already mentioned, the greatest differences are in billiards and netball, but there are also differences in darts (second in the boys' list and eleventh in the girls') and rambling and dramatics (both higher in the girls' list).

To study the relations between the different activities correlations have been calculated and the table of inter-correlations has been factorised (Table 2).

It is interesting to compare the above findings with the results of a survey of school children's interests. Shakespeare reports that "Subjects which allow of bodily activity are the more popular, the abstract and routine subjects less popular. This is true for both boys and girls" (ages 10-13).[1] Tetrachoric correlations were calculated, using S. P. Hayes' table.[2] Since, with few exceptions (none of which is statistically significant), the correlations are positive we can analyse the table for a general factor affecting all the interests. Saturation coefficients obtained by applying Burt's "Least Squares" method of analysis are entered below the table.[3] (The values inserted in the leading diagonal are the communalities for the first and second factors obtained after the second summation). The common factor underlying all the correlations may be identified with general interest, by virtue of which persons tend to show a greater or less degree of general or widespread interest as well as that specific to particular activities. When the correlation due to the general factor is eliminated the residual correlations show evidence of a second 'bipolar' or type factor, i.e., a factor which indicates a sub-division both of interests and members into two contrasted types. When the interests are grouped according to their type saturation coefficients it will be seen that the first group of interests consists entirely of physical activities whilst the second contains the intellectual or artistic ones.

The popularity of an activity may be due to its having a specialised appeal causing it to attract persons who show little interest in any other activity; or the activity may draw upon members' general interest. It is the latter kind of interest which, if properly stimulated and developed, will go further towards promoting a community spirit than the other. The extent to which this general interest contributes to the popularity of the activities is shown by the 'general factor saturations' as they are termed. The order according to degree of influence of the general interest is as follows: Rambling, swimming, dramatics, hobbies, camping, dancing, 'keep-fit,' cycling, discussion, table tennis, reading, quiet games, darts, physical training. It is interesting to note that many of the activities which are high in the list of popularity (Table I) have low saturations. Everyone is familiar with the kind of person who is happy enough whilst monopolising the tennis table or dart board but who, when these activities are not available, stands around, hands in pockets, paying little attention to anything else going on. Similarly there are always some to be found in a quiet corner content to spend a whole evening poring over a book, playing some quiet game or talking among themselves; unaware of others unless their noise or more boisterous activity disturbs them. These interests may be encountered quite frequently, but since they tend to develop to the exclusion of others they have low saturations for the factor

[1] SHAKESPEARE, J. J., this *Journal*, vol. 6, 1936.
[2] HAYES, S. P., Jun., "Tables for calculating a tetrachoric correlation," *Journal of Educational Psychology*, vol. 30, 1939.
[3] C. BURT, *Factors of the Mind*, University of London Press, 1939.

TABLE 2.

CORRELATIONS BETWEEN INTERESTS.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.—Rambling	(·66)	·54 ·08	·65 ·06	·44 ·08	·61 ·07	·54 ·07	·62 ·07	·55 ·08	·42 ·08	·14 ·09	·37 ·08	·13 ·09	−·08 ·10	−·05 ·10
2.—Swimming	·54	(·70)	·33 ·09	·38 ·08	·62 ·08	·32 ·09	·40 ·08	·52 ·08	·27 ·09	·58 ·08	·12 ·10	·28 ·09	·47 ·09	·29 ·10
3.—Dramatics	·65	·33	(·77)	·51 ·08	·29 ·10	·66 ·07	·34 ·08	−·03 ·10	·66 ·06	·10 ·13	·50 ·07	·29 ·09	−·02 ·10	−·03 ·09
4.—Hobbies ..	·44	·38	·51	(·53)	·38 ·09	·36 ·09	·59 ·09	·52 ·08	·48 ·08	·12 ·12	·48 ·08	·36 ·08	·05 ·10	·12 ·10
5.—Camping..	·61	·62	·29	·38	(·64)	·38 ·10	·52 ·09	·70 ·06	−·02 ·10	·29 ·13	·08 ·09	·29 ·09	·21 ·10	·26 ·09
6.—Dancing ..	·54	·32	·66	·36	·38	(·48)	·51 ·09	·06 ·14	·37 ·09	·65 ·13	·23 ·10	·28 ·10	·18 ·10	·02 ·10
7.—'Keep Fit'	·62	·40	·34	·59	·52	·51	(·37)	·17 ·10	·07 ·08	·33 ·11	·08 ·09	−·12 ·09	−·12 ·09	·48 ·08
8.—Cycling ..	·55	·52	−·03	·52	·70	·06	·17	(·38)	·22 ·10	·28 ·13	·17 ·12	·17 ·10	·13 ·11	·15 ·12
9.—Discussion	·42	·27	·66	·48	−·02	·37	·07	·22	(·49)	·10 ·12	·44 ·08	·40 ·08	−·13 ·09	−·05 ·12
10.—Table Tennis	·14	·58	·10	·12	·29	·65	·33	·28	·10	(·36)	·17 ·12	·47 ·34	·58 ·10	·00 ·11
11.—Reading ..	·37	·12	·50	·48	·08	·23	·08	·17	·44	·17	(·33)	·53 ·08	·08 ·09	−·08 ·09
12.—Quiet Games	·13	·28	·29	·36	·29	·28	−·12	·17	·40	·47	·53	(·21)	·34 ·08	·15 ·09
13.—Darts ...	−·08	·47	−·02	·05	·21	·18	−·12	·13	−·13	·58	·08	·34	(·16)	·12 ·09
14.—Physical Training ..	−·05	·29	−·03	·12	·26	·02	·48	·15	−·05	·00	−·08	·15	·12	(·10)
General Factor Saturations	·80	·75	·72	·72	·71	·69	·60	·55	·53	·52	·47	·46	·23	·19
Type Factor Saturations	−·10	·37	−·50	−·14	·37	−·10	·12	·28	−·46	·29	−·33	−·04	·33	·26

RE-ARRANGEMENT TO SHOW GROUPING OF INTERESTS.

Camping.	*Swimming.*	*Darts.*	*Table Tennis*	*Cycling.*	*Physical Training.*	*'Keep Fit.'*	*Quiet Games.*	*Dancing.*	*Rambling.*	*Hobbies.*	*Reading.*	*Discussion*	*Dramatics.*
·37	·37	·33	·29	·28	·26	·12	−·04	−·10	−·10	−·14	−·33	−·46	−·50

of general interest. Physical training which has the lowest factor saturation is rather anomalous and it is possible that the result is an artifact due to the slight confusion in connection with this entry in the enrolment form.

When the analysis of interests is carried a stage further two groups emerge which fit in with the usual idea of an athletic type interested mainly in outdoor pursuits, in contrast with a more sedentary type with intellectual or artistic interests, especially dramatics, discussion and reading (see type factor saturations at foot of Table 2). It would appear evident that the youth centre which set out to cater for both these types would be most likely to succeed.

We can next see how far the sex differentiation follows the type dichotomy. Direct comparison between Table 1 and the type analysis is complicated by the fact that there are general differences in the popularity of the activities and also in the mean interest frequencies for the sexes. When these are allowed for[1] we find that the boys show relatively more frequent interest in the athletic activities (as we should expect) whilst the girls are more interested in the artistic ones; especially dramatics and dancing. Thus the pattern of interest shown by the sexes corresponds fairly closely with that of the interest types, and, in general, we may say that the majority of the girls are of the artistic type whilst the boys are mainly of the athletic type. The intellectual activities show no special sex differentiation.

Group I Activities.	*Boys.*	*Girls.*	Group II Activities.	*Boys.*	*Girls.*
Darts	+16·9	−16·9	Dramatics	−18·6	+18·6
Physical Training	+8·4	−8·4	Rambling	−11·1	+11·1
Cycling	+4·4	−4·4	Dancing	−3·1	+3·1
Camping	+1·9	−1·9	Reading	+0·4	−0·4
Swimming	+0·9	−0·9	Discussion	+0·4	−0·4
Table Tennis	+0·4	−0·4	Hobbies	+0·9	−0·9
'Keep Fit'	−6·6	+6·6	Quiet Games	+4·9	−4·9

IV.—The problem of attendance.

A subsidiary question which arose was whether the enrolment forms could provide any indication of how long persons were likely to remain at the Centre.

Fifty-two of the 140 enrolled members had ceased to attend after two or three meetings. Examination of their entry forms showed that there was no difference in the number of interests they claimed as compared with the rest. The proportions leaving were the same in both sexes. Table 1 shows that there was no marked difference in the numbers who were interested in the different activities as compared with the staying group, with the exception of hobbies and dramatics. These differences (both approximately 3xP.E.) indicated a greater tendency to leave among those who claimed the two interests. Presumably they did not consider the facilities to be adequate or preferred to pursue these recreations at home.

It is somewhat surprising that the initial interests seem to have so little relation to earlier or later leaving. With the exception of the few persons who were interested in hobbies or dramatics and left the Centre, the enrolment forms appear to give no indication on the question of how long individuals will remain at the Centre. Naturally the facilities offered, the enthusiasm and personality of the group leader and the management of the Centre, will contribute largely to the general popularity, but they would not necessarily indicate why some persons left the Centre whilst others claiming the same interests remained.

In view of the negative findings in connection with the initial interest of the entrants, it is worth noting that when they were divided into two groups according to the homes from which they came, members from the better class homes showed a significantly greater

[1]A simple procedure is to subtract the mean interest frequency for each sex so eliminating differences in the general interest levels of the sexes and then substract the mean frequency for each interest to remove general differences in popularity of the interests. The resulting 'doubly-centred' deviations are given below. They clearly show the pattern of interest for each sex.

tendency to leave. (Percentage leaving from better class homes = 43; percentage from poorer homes = 27; difference, 3xP.E.) Probably the better home amenities of the first group made it less necessary for them to rely upon the Centre for their recreation. Another suggestion (which was supported by the supervisor) was that the entrants from the better district tended to regard themselves as socially superior to the others, with the result that they kept to themselves and when one member left the others followed.

V.—Summary and conclusions.

1.—The foregoing analysis of youth's interests from data obtained at the Hebburn Youth Centre has shown that the entrants had a generally wide scope of interest; the percentage of the group expressing interest in the different activities ranged from 90 per cent. (interest in table tennis) to 31 per cent. (interest in hobbies). Sports and physical activities were the most popular.

2.—Analysis of the interests showed that some had a very specialised appeal attracting members who showed little interest in other aspects of the Centre (e.g., darts, table tennis, reading), whilst others drew upon a more general interest. This latter kind of interest is the one which is most likely to promote a community spirit.

3.—When differences in general interest were eliminated the results fitted in with the usual idea of an athletic type, interested primarily in physical activities in contrast with a more sedentary type having artistic and intellectual interests. The boys mostly belonged to the former type and the girls to the latter.

4.—An incidental problem was to see what activities were most likely to hold the interests of members. The only positive finding on this point was that members who left claimed interest more frequently in hobbies and dramatics than those who stayed. It appeared, therefore, that the initial interest claimed gave little indication of which persons would remain at the Centre. However, the evidence suggested that home facilities, and in some cases social snobbery, were more active in determining which persons maintained their interest in the Centre.

Acknowledgment.

I wish to express my thanks to the Holystone Youth Centre, Hebburn-on-Tyne, for permission to make use of the material analysed in this paper.

THE EDUCATIONAL INTERESTS OF A GROUP OF YOUNG INDUSTRIAL WORKERS.

By W. D. WALL
(*Education Department—University of Birmingham*)

I.—*Introductory—nature and source of group.* II.—*Distribution of likes and dislikes among twenty-eight suggested subjects—sex differences in preferences—marked emphasis on practical and non-verbal pursuits especially among boys—effects of unfamiliarity or lack of success in determining choices.* III.—*Range of preferences, willingness to co-operate with others, and dislikes—sex differences in these.* IV.—*Requests for topics not mentioned in questionnaire.* V.—*Implications of this and other studies for D.C.S. curriculum.* VI.—*Summary and conclusions.*

I.—Introductory.

For just over six months, all entrants to an experimental Day Continuation School have been asked to complete a simple questionnaire on their educational interests. All the youths concerned range in age from 14+ to 16 years and are employed by one large government installation. Entry to the scheme and attendance are voluntary but the day so spent is included in the working week for the purpose of pay and few of those eligible did not apply. They form a further sample of those adolescents whose intellectual, educational and social status have been previously described by the present writer in this *Journal*.[1] It is sufficient here to recall that intellectually and educationally they represent the lower two-thirds of elementary school leavers in a district partly rural and partly urbanized with a sprinkling of children who for one reason or another left technical and secondary schools at the age of 14. In all, there are 135 adolescents, 90 girls and 45 boys.

Each student when applying for entrance was asked to indicate on a list of twenty-eight subjects those liked very much, those liked quite well, those in which he or she was prepared to take part if others wished for them and those actively disliked. The subjects were chosen in part according to what could be offered considering the limitations of staffing and equipment, in part according to experience obtained in previous similar schemes by the writer and by those associated with him,[2] and in part according to what seemed to be implicit in the published accounts of Day Continuation Schools.[3] In addition each entrant was asked to make suggestions for any subjects not covered by the questionnaire. Adequate motivation in answering the questionnaire was assured since the boys and girls knew that they would be put into a group according to their preferences and would have an opportunity of discussing their choices with their group leaders before the final curriculum was decided upon.

II.—Educational preferences.

Table I presents an analysis of the preferences of the group. Each subject is described in the words actually used in the questionnaire.

Within this somewhat limited field of proposed topics, there is surprisingly little unanimity of interest. There is *no* subject which is liked " very much " or " quite well " by two-thirds of the boys ; and only cooking, dancing, music and typing are liked " very much " or " quite well " by two-thirds of the girls. Further there are marked sex differences in the degree of interest shewn, the degree of willingness to co-operate and in the numbers of those in each group who actively dislike twenty out of the twenty-eight subjects offered.

[1] Vol. xiv, pt. 1, Feb. 1944.

[2] Thanks for suggestions are due to Miss I. L. Foster, Miss N. L. Gibbs, Miss L. Turner, Mr. S. E. Redman, Dr. J. A. W. Chapman, and Mr. H. Cloke.

[3] The writings of P. I. Kitchen, of A. E. Morgan, of Wray and Fergusson, of Margaret Phillips, and others.

TABLE I.

DISTRIBUTION OF PREFERENCES IN A GROUP OF 135 ADOLESCENTS (45 BOYS, 90 GIRLS).

	Liked very much per cent.		Liked quite well per cent.		Would join in per cent.		Disliked per cent.	
	B	*G*	*B*	*G*	*B*	*G*	*B*	*G*
1. Cookery	0	53	0	24	0	12	100	10*
2. Needlework and Dressmaking	0	34	0	29	0	16	100	21*
3. Embroidery	0	19	0	29	0	26	100	26*
4. Art (that is design, painting, painting china, modelling, etc.)	0	11	15	14	11	21	73	53*
5. Dancing—of all kinds	20	71	2	19	4	3	73	7*
6. Keep-fit—rhythmic exercises and games	20	30	29	19	4	16	47	36
7. Dramatics (reading and acting plays, making costumes, props, etc.)	0	11	0	13	7	32	93	43*
8. Making and Working a Puppet Theatre	0	2	2	4	11	20	87	73
9. Producing a Newspaper or Magazine	2	0	7	10	7	17	84	73
10. Home Craft and Household Science (electrical gadgets, gas and other fuels, laundry work, etc.)	4	1	7	10	16	20	73	69
11. Discussion Circle on any topic of interest (e.g., films, wireless, etc.)	7	1	11	8	20	22	62	69
12. Music—from swing to classics	4	38	7	29	13	18	76	16*
13. Learning about living creatures especially ourselves	7	2	7	7	9	14	78	77
14. Shorthand	2	44	2	21	4	9	91	26*
15. Typing	2	54	4	14	4	9	89	22*
16. First-Aid, Home Nursing, etc.	2	22	0	30	4	23	93	24*
17. Hygiene	0	14	0	8	9	26	91	52*
18. Handicrafts of various kinds (woodwork, metal work, rug-making, leather work and so on)	44	11	18	24	9	17	29	48*
19. Workshop Drawing	22	0	24	0	22	8	31	92*
20. The use of Workshop Tools	27	1	36	0	18	6	20	93*
21. Studying various mechanisms (petrol, steam, oil, etc.)	47	1	11	0	16	6	27	93*
22. Reading and Discussing *any* books brought by members	7	1	4	10	7	27	82	62*
23. Workshop Calculations	33	0	24	0	20	6	22	94*
24. Arithmetic	24	2	27	9	18	21	31	68*
25. Letter Writing	0	9	11	22	16	19	73	50*
26. Elocution	4	17	7	17	13	18	76	49*
27. Study of Local Conditions (industry, housing, government, etc.)	4	2	9	0	13	18	73	80
28. Modern History	2	2	20	7	9	11	69	80

* In a... differences of 23 per cent. or more are 21 times S.E. of difference.

This lack of a core of interests common to most members of one sex and of overlap between the sexes makes curriculum provision for mixed groups extremely difficult within the limitations of staffing normally applied—unless, of course, the numbers catered for by any Day Continuation School are large enough to provide a wide range of sub-division into many teaching units.[1]

Table II shews those subjects in which *more than half* of either sex group is prepared to participate, listed in order of descending popularity.

TABLE II.

PREFERRED SUBJECTS IN ORDER OF PREFERENCE—135 ADOLESCENTS.

GIRLS (90)		*BOYS* (45)	
Subject.	per cent. Participants.	Subject.	per cent. Participants.
5 Dancing	93	20 Use of Workshop Tools	80
1 Cookery	90	23 Workshop Calculations	78
12 Music	84	21 Study of Mechanisms	73
2 Needlework and Dressmaking	79	18 Handicrafts	71
15 Typing	78	19 Workshop Drawing	69
16 First-Aid, etc.	76	24 Arithmetic	69
14 Shorthand	74	6 Keep-Fit	53
3 Embroidery	74		
6 Keep-Fit	64		
7 Dramatics	57		
18 Handicrafts	52		

Complementary to this is Table III, which shews those subjects which are 'actively disliked' by two-thirds or more of both groups.

TABLE III.

SUBJECTS ACTIVELY DISLIKED BY 67 PER CENT. OR MORE OF EACH GROUP.

8 Making and Working a Puppet Theatre.	27 Study of Local Conditions, etc.
9 Producing a Newspaper or Magazine.	28 Modern History.
13 Learning about Living Creatures, etc.	10 Home Craft and Household Science.

In general, Tables I, II and III shew agreement with the somewhat scanty data already obtained in this or similar fields. Rallison[2] found that among his children of 11+ to 13+ of a similar educational background to the present group, both sexes shewed an outstanding interest in vocations, games and physical training, and that girls only shewed an interest in domestic activity: King,[3] questioning elementary school leavers in a district of East London, found that few wished to learn any more history or literature, still fewer saw the use of geography, while mathematics, shorthand and book-keeping were much in favour, and a fair number of both sexes were desirous of doing higher work in music and drawing. Among the 169 boys of 15+ in a Day Continuation School at Bristol,[4] 84 enjoyed Machine Drawing, 83 enjoyed Mathematics, 63 World Affairs, while only one voted for classes on

[1] This seems to suggest that the running of independent schemes by private firms would be unsatisfactory and uneconomic. The Day Continuation School should cater for even larger numbers daily, if possible, than the ordinary Day School in a large town.

[2] This *Journal*, Vol. ix, Pt. 2, June, 1939, "The Scientific Interests of Senior School Children," and Vol. xiii, Pt. 1, Feb., 1943, "The Interests of Senior School Children in Non-Scientific Subjects."

[3] "*The Employment and Welfare of Juveniles*," 1925, pp. 91-2.

[4] Brief report from Stokes Croft Day Continuation School, Bristol, in *Times Ed. Supp.*, Apr. 28th, 1945.

Citizenship. Pallister[1] found that among Scottish School leavers, athletics for both sexes, woodwork and engineering for boys, and sewing and domestic activities for girls, were the favoured choices.

The tables bring out strikingly the practical and non-verbal nature of the preferences of both girls and boys of this particular intellectual and educational background. In the boys' list there is no subject into which verbal mastery enters to any great extent though the characteristic sex preferences for number and mechanical things are much in evidence. In the girls' list, though in view of the known verbal superiority of girls one might have expected differently, there is a similar predominance of practical, non-verbal activities. The only subjects which could be said to have a marked verbal bias are two of a vocational nature—Typing and Shorthand—in which manual and perceptual skills are paramount, and Dramatics, which relies for its appeal not primarily upon its verbal element but upon impulses of display and self-identification with adult characters. This tendency away from the written and spoken word is marked when one considers the subjects disliked listed in Table III, all but the last of which, No. 10, are primarily verbal. The dislike of Home-craft is probably traceable to the fact that most of the girls and not a few of the boys are expected to help with domestic work at home. "We have enough of this in our spare time," is a frequently heard complaint against subjects of a purely domestic utility.

This dislike of verbal subjects is, however, not the only reason which leads to their rejection. If those subjects which are disliked by 50 per cent. or more of each group are examined, two other tendencies are discernible. There is a disinclination to take up those activities which are *unfamiliar* to the elementary school child in the area (for example Nos. 8, 9 and 11). In part perhaps this confirms the comment made by Wray and Fergusson[2] that the average adolescent worker has an aversion to live thinking; in part it may be a fear of the new and of failing in the attempt, for, if any characteristic is outstanding in the make-up of these children, it is their low educational *morale*. The second tendency is a distaste for those subjects in the elementary school curriculum in which they have had little demonstrable success (for example Nos. 13, 27, 4, and 25).

The entire absence from the boys' list and the scanty representation in the girls' preferences of any subject of æsthetic appeal is striking; nor is there in either any indication that social or political awareness has been aroused at school in the bulk of the present group—a confirmation of a previous finding of the present writer.[3]

III.—The Range of Preferences.

As far as possible the original list was framed to include a high proportion of activities in which boys and girls could play an equal part. Of the topics, five (Nos. 1, 2, 3, 14, and 15) might be considered predominantly girls' activities and four (Nos. 19, 21, 23, and 20) predominantly boys'. Of the remainder, although some are biassed slightly towards one or other of the sexes, none could be called a pursuit specifically determined by sex. Table IV is, therefore, of some interest in that it shews that for this range of subjects and in this group, the boys are interested in fewer items in the list, are willing to co-operate in fewer, and actively dislike more than do the girls. All these differences are statistically reliable.

TABLE IV.

Average Numbers of Subjects Liked, Tolerated and Disliked—90 Girls, 45 Boys.

	Liked.		Would join in.		Disliked.	
	Av.	S.D.	Av.	S.D.	Av.	S.D.
Girls	8·3	3·3	4·0	4·0	15·5	5·2
Boys	6·3	3·9	2·2	3·5	19·8	5·4

[1] "Vocational Preferences of School Leavers in a Scottish Industrial Area."—B.J.P. Vol. xxix, Pt. 2, Oct. 1938.

[2] *A Day Continuation School at Work*, 1920, p. 15.

[3] "The Decay of Educational Attainments in a Group of Adolescents," this *Journal*, Vol. xiv, Pt. 1, Feb., 1944.

Some of these differences are probably accounted for by the fact that boys might consider many of the subjects of the list as 'cissy' and fit only for girls. Indeed the figures, particularly in the third column, of Table IV ('Disliked'), should perhaps be interpreted as part of the prejudice of a particular social class against culture, a prejudice very much more marked in the case of the boys.[1]

IV.—Other requests.

The questionnaire left room for requests to be made for specific subjects not included in the list. It is instructive that only 20 per cent. of the girls and 44 per cent. of the boys made additional suggestions. Among the thirty suggestions made by girls, fourteen were for French and the remainder (none of which was put forward more than twice) for such things as Music, Tennis, German, Book-keeping, Dress Designing, 'Artistic Drawing,' Films, and Wireless. Among the twenty-four suggestions made by boys, seven are for electrical engineering, five for Algebra, three for French and the remainder (none of which was made more than twice) for Engineering Workshop Practice, English, German, Radio Engineering, Chemistry and Latin.

The demand for French[2] and other languages by both groups has been noted by previous investigators and the suggestion made that the attraction lies in its æsthetic appeal. No doubt this is true in part but conversations with the young people themselves suggest that interest also springs from vague aspirations to travel and from the value of French in their eyes as a distinguishing feature of the secondary school child. It represents an unfulfilled ambition which the writer has frequently encountered among adults of a similar educational background, verbalised in the form "Of course, I never had the chance of a secondary education—I wish I had had."

V.—Implications for the curriculum.

It must be re-emphasised that the present group is too selected and homogeneous to be representative of all children for whom continued education is to be provided under the 1944 Education Act. Further, experience suggests that in such groups as this a profound change in attitude and motivation may take place between 16 and 18. Nevertheless, there is little reason to believe them unrepresentative of elementary school leavers in areas partly rural and partly urbanised or of adolescent workers in the less skilled or unskilled industrial and clerical occupations.

For such as these it seems that a three-fold purpose must dominate the framing of a curriculum. Their practical and vocational bias must be studied and catered for, particularly in the initial stages. This is emphasised by A. E. Morgan, who writes[3] that the curriculum of the Day Continuation School must be framed on a "realisation that many of its inmates will burgeon most readily by being given an opportunity for practical expression." No less important is the discovery and remedying of educational weaknesses and the eradication of the emotional attitudes which underly them by methods tactfully designed to meet individual difficulties.[4] In the stages after 16, which are noticeably more receptive, an attempt can be made to broaden the bases of culture and to arouse political and social awareness.[5]

[1] Burt (this *Journal*, Vol. xv, pt. 1, pp. 22-3) has already raised the point as to whether semi-literacy is not itself partly a product of the turning away of a social class from accepted forms of culture. It is possible that we have here a generalisation and fixation of the tendency towards affective thinking commented upon by Varendonck (*The Psychology of Day Dreams*, p. 348) as a primitive stage in the development of the race and of the individual.

[2] Pritchard: this *Journal*, Vol. v, Pt. 2, June, 1935, p. 175.

[3] *Young Citizen*, Penguin Edn., p. 91.

[4] "The Continuation School Teacher is essentially a cobbler," Margaret Phillips, *Young Industrial Worker*, p. 31, vide also paper by present writer previously cited and article in the *Times Ed. Sup.*, August 5th, 1944.

[5] Wheeler, *Youth*, pp. 94-99, suggests that games, the practice of an art or craft, simple scientific—especially biological—study, the theory and practice of social life, religion, History, Geography and Civics form an irreducible minimum for the period 11 to 16 years.

VI.—Summary and Conclusions.

1.—The 135 adolescents concerned in this study may be considered as representative of the lower ranges of those leaving school in an area partly rural and partly urbanised and of young workers employed in less skilled and semi-skilled industrial and clerical jobs. Each of the 90 girls and 45 boys indicated his or her preferences among a limited range of subjects of vocational or cultural significance as a preliminary to entrance into an experimental Day Continuation Scheme.

2.—An analysis of these preferences shews marked sex differences in attitude to Art, Dancing, Dramatic Work, Music, Hygiene, Handicrafts, Reading and Elocution as well as to those subjects in attitude to which a sex difference would be expected.

3.—In both sex groups there is marked preference for practical activities, especially for those of apparently vocational significance, and an equally marked turning away from verbal subjects and from anything reminiscent of the Elementary School curriculum. In neither group is there much evidence of any truly cultural interest.

4.—The number of activities preferred and the number in which each would willingly co-operate if others wished for them are significantly higher among the girls and the number actively disliked significantly lower than among the boys. The boys make more suggestions for subjects (mostly vocational) which might be included than do the girls.

5.—In view of these conclusions it is suggested that the curriculum for such adolescents should include a high proportion of practical activities, that an attempt should be made to remedy defects in their formal education, and to remove wrong attitudes to verbal subjects, and that the introduction of subjects of wider cultural significance should be tentative only in the years from 14 to 16, after which a more serious effort can be made with some likelihood of success.

A COMPARISON OF THE ORDERS OF MERIT OF H.S.C. CANDIDATES OFFERING TWO MODERN LANGUAGES.

By JAMES A. PETCH.

I.—*The object and conditions of the enquiry.* II.—*Comparison of orders of merit*: (*a*) *in the subjects*; (*b*) *in the sections of the subjects*; (*c*) *at successive attempts.* III.—*Summary.*

I.—Object and conditions.

This paper gives a brief account of the results of an enquiry into the performances of candidates who offer two modern foreign languages in the Higher School Certificate Examination of the Joint Matriculation Board.[1] The purpose of the enquiry was to answer three questions.

(1) How does a candidate's performance in one foreign language compare with his performance in a second such language?

(2) How does his performance in a section of a modern language subject compare with his performance in any other section of that language and with his performance in the sections of the second language? (The sections into which the subjects are divided for examination purposes are shown in Table I.)

(3) When candidates make more than one attempt at the examination, what variation is there in the successive orders of merit either in the languages regarded as whole subjects or in the various sections?

The method and data of the enquiry were subject to certain conditions.

(*a*) There are no absolute standards of comparison available. The method therefore has been to determine correlation coefficients as between orders of merit.[2]

(*b*) The performances considered were performances in the examination room with all that this implies of limitation of scope and opportunity both for the candidate and for the examiner. It is not the purpose of this paper to discuss what is the function of examinations or what importance is to be attached to examination verdicts.[3]

(*c*) Only performances in modern languages at the Principal stage in the H.S.C. Examination have been considered and wherever reference is made in this paper to performances in modern languages the reference is to languages offered as Principal subjects.

(*d*) To allow for the effects of any unintentional variations in the standard of the question papers—advance notice is always given of any deliberate change in standard, style or content—the performances of candidates in three successive years have been analysed, the three years comprising a period in which the only changes in the syllabuses were changes in the set books for Paper II in each language.

At the outset of the enquiry two complications were encountered. In due course it was found that neither of them did in fact affect the results but it is necessary to record that these two points have not been ignored.

(i) In the period in question there were changes in the panels of examiners who set the question papers and marked the scripts (Table I). Moreover in each of the three years

[1] I am indebted to the Board for permission to publish this paper and to Professor C. W. Valentine for advice on its presentation. For any opinions expressed the responsibility is mine alone. (For a similar enquiry into performances in classics *vide* Vol. IX (1939) of this *Journal*, part II, pp. 174-187.)

[2] Unless otherwise stated correlation coefficients quoted in this paper have been calculated in accordance with the product moment method of which an accessible account can be found in c. VI of Chambers' *Statistical Calculation for Beginners* (Cambridge, 1940). For fuller details see Fisher's *Statistical Methods for Research Workers* (London, 1936).

[3] That the verdicts passed by the examiners are not wildly arbitrary is shown by the large measure of agreement between the verdicts and the results anticipated by school staffs as embodied in the "School Estimates" submitted before the examination begins. The following mean "coefficients of ranked correlation" (*vide* Chambers, *op. cit.*, c. VII) between the estimates and the examination results are given with the necessary reservations: French 0·80; German 0·85; Spanish 0·87.

more than 1,500 candidates offered Principal French and it was therefore impossible for one examiner to mark the work of all candidates on any one section of the subject.[1] Though it is not claimed that there is absolute agreement between the assessments of members of marking panels, investigation shows that for the present purpose it is permissible to ignore the identity of the examiner passing any particular verdict.

TABLE I.

PAPERS, MARKS AND EXAMINERS.

Papers and sections of papers with percentage of maximum marks allotted to each section.		*Examiners.*		
		1st year.	*2nd year.*	*3rd year.*
FRENCH	Paper I: French Prose and Essay (27·5%)	L, M	L, M	L, M
	Unseen Translation from French (30%)..	M, N	M, N	M, N
	Paper II: Literature (27·5%)..	O, P, Q	P, Q, R	Q, R, S, T,
	Oral: Reading, Dictation, Conversation (15%) .	M, N, O, P, Q and 5 others.	M, N, O, P, Q, R and 4 others.	M, N, O, Q, R, S and 3 others.
GERMAN	Paper I: German Prose and Essay (27·5%)	W	W	Y
	Unseen Translation from German (27·5%)	W	W	Y
	Paper II: Literature (30%) ..	X	X	W
	Oral: Reading, Dictation, Conversation (15%) .	W, X, Y	W, X	W, Y
SPANISH	Paper I, Paper II and Oral: Arrangement and marks as for German	Z	Z	Z

(ii) Approximately one in every eight candidates who offer French also offers German while one in every forty offering French offers Spanish (Table II). On the other hand those who offer German or Spanish and do not also offer French are negligible in number as also are those who combine German with Spanish. This enquiry therefore covers virtually all candidates who offered German or Spanish in these three years but only about one-eighth of the French candidates. It has however been ascertained that what is said here of the performances in French of the candidates who offer a second modern language is equally applicable to the performances in French of those who do not.

TABLE II.

CORRELATION BETWEEN PERFORMANCES IN TWO MODERN LANGUAGES.

	Number of Candidates.	*French-German.*	*Number of Candidates.*	*French-Spanish.*
1st year	131	0·79	35	0·74
2nd year	126	0·79	43	0·81
3rd year	160	0·67†	35	0·74*

†(±0·03). *(±0·05).

(Only the greatest " probable error " is given for each group of coefficients in Tables II to IV, *N* being constant or nearly so for each group.)

[1] The division of the subjects into sections and the arrangements for marking the scripts are shown in Table I. Thus in the first year three examiners shared the marking of Paper II in French, the scripts being divided into three blocks according to schools and each block going to a single examiner. Of these three examiners two acted again in the second year, the third being new to this particular work. Of the four examiners required in the third year only one acted in all three years.

II.—COMPARISON OF ORDERS OF MERIT.

The extent of the agreement between a candidate's performances in two modern languages is shown by Table II. This gives the correlation coefficients which result when the order of merit of performances in French is compared with the order of the same candidates' performances in their other foreign language, German or Spanish as the case may be. In each year there is a considerable measure of agreement[1] between the orders in French and German and between the orders in French and Spanish, though it is somewhat surprising that the agreement between the orders of merit in the two Romance languages is no more marked than that between the orders in French and German.

Table III indicates the answer to the second question—how performances in one part of a language compare with performances in other sections of the same language and in the sections of the second language offered. It is not possible within the limits prescribed for this paper to give in full all the coefficients which result from comparing performances in the various sections in each of the three years, and Table III gives under each section heading a mean value for three coefficients. As already indicated there is not enough material for satisfactory comparisons between performances in German and in Spanish.

No pair of sections produced in all three years a coefficient as great as 0.70 and only one pair, German Prose and Essay and German Unseen, did so twice. The following pairs each twice produced coefficients as great as 0·60 :

French Prose and Essay and Spanish Unseen.
German Prose and Essay and German Oral.
French Unseen and German Unseen.
French Oral and Spanish Unseen.
German Unseen and German Oral.
French Prose and Essay and Spanish Prose and Essay.
French Prose and Essay and French Unseen.
French Prose and Essay and German Prose and Essay.

French Prose and Essay appears four times in this list, German Prose and Essay and German Unseen each appears three times, French Literature, German Literature, Spanish Literature and Spanish Oral make no appearance at all. Since in a complete list of pairings each French section would appear eleven times, each German and each Spanish section seven times (Table III), the slight superiority in the number of appearances of French Prose and Essay in the list above is hardly significant. What is significant is the comparative infrequency with which any one section consistently shows " quite a good value " for the correlation between performances in that section and in any other section.

Paper I as a whole, that is Prose, Essay and Unseen, may be regarded as comprising the linguistic side of the written work in contrast with the literary side represented by Paper II. The following mean coefficients result from comparing performances in the various linguistic papers :

French Paper I and German Paper I.....	0·68
French Paper I and Spanish Paper I.....	0·71

These results are somewhat higher than the general run of the mean values given in Table III for the correlations between the various sections of Paper I in the three languages.

A comparison of performances in Paper I with performances in the Orals produces the following mean coefficients :

French Paper I and French Oral	0·61
French Paper I and German Oral	0·52
French Paper I and Spanish Oral	0·55
German Paper I and German Oral	0·67
Spanish Paper I and Spanish Oral	0·60

Again these results are somewhat higher than the correlations between the Orals and the various sections of Paper I in each language.

[1] " 0.65 is quite a good value for the correlation between two academic subjects." (F. Sandon in *Annals of Eugenics*, vol. VII (1936), part I, p. 80).

TABLE III.

CORRELATION BETWEEN PERFORMANCES IN THE SECTIONS (MEAN VALUES).

		FRENCH				GERMAN				FRENCH AND GERMAN		SPANISH				FRENCH AND SPANISH	
		Prose and Essay	*Unseen*	*Lit.*	*Oral*	*Prose and Essay*	*Unseen*	*Lit.*	*Oral*	*Mean*	*S.D.*	*Prose and Essay*	*Unseen*	*Lit.*	*Oral*	*Mean*	*S.D.*
FRENCH	Prose and Essay	—	0·60	0·31	0·56	0·60	0·55	0·35	0·46	0·50	0·14	0·61	0·66	0·23	0·56	0·54	0·21
	Unseen	0·60	—	0·29	0·51	0·51	0·64	0·37	0·48	0·49	0·15	0·38	0·62	0·22*	0·44	0·46	0·19
	Literature	0·31	0·29	—	0·23†	0·37	0·36	0·49	0·33	0·34	0·09	0·35	0·36	0·51	0·28	0·35	0·09
	Oral	0·56	0·51	0·23†	—	0·48	0·49	0·31	0·54	0·45	0·14	0·44	0·64	0·34	0·44	0·48	0·17
GERMAN	Prose and Essay	0·60	0·51	0·37	0·48	—	0·73	0·41	0·66	0·55	0·18	—	—	—	—	—	—
	Unseen	0·55	0·64	0·36	0·49	0·73	—	0·44	0·62	0·56	0·17	—	—	—	—	—	—
	Literature	0·35	0·37	0·49	0·31	0·41	0·44	—	0·36	0·39	0·07	—	—	—	—	—	—
	Oral	0·46	0·48	0·33	0·54	0·66	0·62	0·36	—	0·50	0·16	—	—	—	—	—	—
SPANISH	Prose and Essay	0·61	0·38	0·35	0·44	—	—	—	—	—	—	—	0·49	0·37	0·52	0·45	0·11
	Unseen	0·66	0·62	0·36	0·64	—	—	—	—	—	—	0·49	—	0·32	0·52	0·53	0·17
	Literature	0·23	0·22*	0·51	0·34	—	—	—	—	—	—	0·37	0·32	—	0·10*	0·30	0·14
	Oral	0·56	0·44	0·28	0·44	—	—	—	—	—	—	0·52	0·52	0·10*	—	0·42	0·18

†(±0·03) *(±0·06)

If performances in Paper I are compared with performances in Paper II (Literature) in the same or another language, the coefficients which result are no higher than those which result from comparing performances in the various sections of Paper I with performances in Paper II (Table III).

Thus the answer to the second question raised is that there is in general no marked relationship between a candidate's performance in one section of one language and his performances in other sections of that language or in the sections of his second language. It is not surprising that there is likely to be most similarity between a candidate's position in the order of merit in German Prose and Essay and his position in the order for German Unseen, but an examination performance in a modern language considered as a whole tends to be a conglomeration of uneven performances in the sections of the language. In no case could a performance in one section of a language be considered a sure prognostic of the candidate's probable performance in any other section, either of the same or of another language. It is especially true that, in general, orders of merit in 'literature' bear no recognisable relationship to orders of merit in 'linguistics'.

There remains the question of successive attempts at the examination. In the second of the three years covered by this enquiry forty-two candidates offered French and German who had also offered these languages in the first year; forty-four offered the two languages both in the second and in the third year. The numbers repeating Spanish and French were smaller, eleven offering them in both the first and second years, fourteen in both the second and third years. The coefficients resulting from comparison of the successive subject orders of merit for these groups are as follows:

French:	1st year—2nd year	0·71
	2nd year—3rd year	0·73
German:	1st year—2nd year	0·77
	2nd year—3rd year	0·76
Spanish:	Mean Value	0·72 (±0·06).

These coefficients show that, though there are changes in the orders of merit for successive attempts by the same candidates, the orders do not change greatly, that there is a strong tendency for the candidate who is low in the order of merit at the first attempt to remain low in the order at the second attempt; a further year's work does not enable him to overtake those who at the first attempt occupied the places above him.

The correlation coefficients for successive performances in the various sections are given in Table IV. The coefficients for successive attempts at German Prose and Essay indicate an appreciable degree of constancy in the orders of merit while both in French Oral and in German Oral the order does not fluctuate violently from year to year. In Spanish Unseen there is much more stability than in French Unseen and in German Unseen, whereas in Spanish Oral there is almost as much fluctuation as in Spanish Literature.

TABLE IV.

CORRELATIONS BETWEEN PERFORMANCES IN SECTIONS IN SUCCESSIVE YEARS

	FRENCH.		GERMAN.		SPANISH.
	1st year—2nd year. (42 candidates)	*2nd year—3rd year. (44 candidates)*	*1st year—2nd year. (42 candidates)*	*2nd year—3rd year. (44 candidates)*	*Mean values (11 and 14 candidates).*
Prose and Essay	0·59	0·64	0·77	0·72	0·62
Unseen Translation	0·59	0·49†	0·54	0·65	0·78
Literature	0·62	0·50	0·52	0·27*	0·40‡
Oral	0·64	0·68	0·64	0·74	0·49
Paper I (Prose, Essay, Unseen)	0·71	0·75	0·77	0·75	0·81

†±0·08. *±0·10. ‡±0·13.

When successive linguistic performances in two languages are compared, that is when Paper I is treated as a whole, the resulting coefficients are higher than those for any pairs of sections; they are of the same magnitude as the coefficients given above for successive attempts at the subjects considered as wholes. These high coefficients resulting from comparisons involving Paper I as a whole cannot be completely explained away on the ground that to the sections which make this paper are allotted somewhat more than half of the marks for the whole subject (Table I) and in consequence, if the orders of merit in the whole subjects produce high coefficients, there must also be high coefficients in those sections which form the preponderating parts of the wholes. Rather it would appear that the orders of merit for linguistic work do of themselves tend towards constancy, somewhat more so than the oral orders and distinctly more so than the orders in literature. The order of merit in composition however is more stable than the order in unseen translation.

III.—Summary.

The answers to the three questions propounded in the first paragraph are as follows.

(1) If a candidate offers French with either German or Spanish as Principal subjects in the Joint Board's H.S.C. Examination, his positions in the two subject orders of merit tend to be similar but no more similar if he offers French and Spanish ($r=0\cdot77$) than if he offers French and German ($r=0\cdot74$).

(2) There is appreciably less agreement between the orders of merit for the various sections of each subject, either within one language or when the orders for sections of two languages are compared. There is in general most agreement between the orders for German Prose and Essay and German Unseen ($r=0\cdot73$), least agreement when the orders for the Literature papers are compared with each other or with the orders for any other part of the work in languages ($r=0\cdot35$).

(3) The orders of merit for candidates who repeat the examination do not fluctuate greatly from year to year in the languages treated as whole subjects ($r=0\cdot74$) and among the subject sections the greatest stability is shown by the linguistic work ($r=0\cdot76$).

THE DISTRIBUTION OF INTELLIGENCE AMONG ELEMENTARY SCHOOL CHILDREN IN NORTHERN IRELAND.[1]

By J. K. FORBES.

I.—*The application of a first Intelligence group test to* 640 *pupils.* II.—*The results of English and Arithmetic attainment tests and correlation coefficients of attainment and intelligence quotients.* III.—*The effects of organised teaching upon the performance of pupils in intelligence tests.* IV.—*Summary.*

I.—The application of a first intelligence test to 640 pupils.

The Coleraine Regional Education Area includes:

(*a*) The Borough of Coleraine, whose population was 9,179 at the 1937 census.

(*b*) The Urban district of Portstewart, an attractive seaside resort with a population of 2,586.

(*c*) The Rural District of Coleraine, inhabited by a comfortable farming community. The total population of the Education Area is about 30,000, of whom 5,000 or thereabouts are children attending public elementary schools, and of these nearly 1,500 belong to an age group ranging from 10+ to 12+ years.

At the suggestion of the Secretary of the Education Committee, Mr. W. R. Johnston, A.R.C.Sc.I., B.Sc., and with the financial assistance of the Committee itself, it was decided to make a study of the distribution of intelligence possessed by the group of school children aged 10+ to 12+ within the area. To secure uniformity and strict adherence to the rules prescribed for intelligence testing, Mr. Johnston accepted responsibility for the administration of the tests. Urban and rural schools of all types were chosen by the Secretary so as to be a representative sample of the whole area, and within these schools all children aged 10+ to 12+ were tested, the only exceptions being those absent from school on the day of the test. The Moray House Intelligence and Attainment tests were used throughout the experiment and the marking was done by a group of local teachers who volunteered their services. Pupils and their schools were designated by a system of numbers so that the utmost secrecy regarding the testees was preserved. This has been the first instance of a number of teachers combining to conduct an experiment of educational research work in the schools of Northern Ireland. The results have already proved valuable and will doubtless stimulate further effort of the kind.

The lines of the experiment were:

(1) A survey of the distribution of levels of intelligence as shown by the application of M.H.T. 25 (including the accompanying Practice Test) to the whole group aged 10+ to 12+.

(2) An estimation of the relationships between the I.Q.s as indicated by M.H.T. 25 and the Attainment Quotients as given by M.H. English and Arithmetic tests 11.

(3) An investigation of the influence of organised teaching upon the performance of the group at an intelligence test.

The Moray House Intelligence Tests standardised on English and Scottish children are recognised to have a high saturation with the factor of general intelligence 'g' and also with the verbal factor 'v.' These two factors account for about 76 per cent. of the variance. The I.Q.s make proper allowance for age and are so arranged that they centre round an average of 100 and have a Standard Deviation of 15. From an examination of the histogram (Fig. 1) and the average I.Q.s obtained from M.H.T. 25 given in Table A, it is evident that the Coleraine group falls short of the level of ability to be expected. The median I.Q. for the whole group was only 91, almost 9 units below normal, and the Standard Deviation was 13·4.

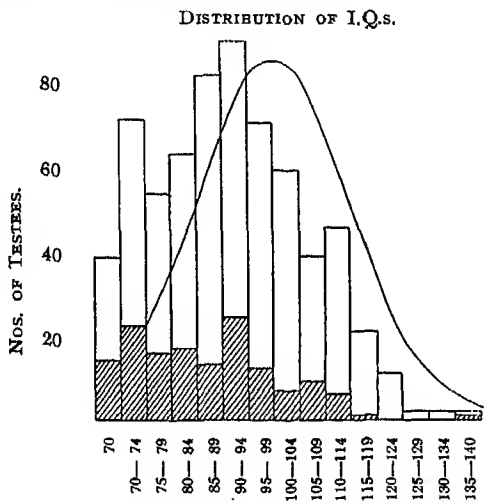
[1] The writer wishes to acknowledge with gratitude his indebtedness to Professor Godfrey Thomson and to Professor C. W. Valentine for their constructive suggestions and criticism in the preparation of this article.

It is reasonable to infer from these results :

(1) That the intelligence of the Coleraine group is below normal ;
or

(2) That the M.H.T. 25 is not a perfect criterion to gauge the intelligence of the children of this area.

The results of certain tests that have been given in America do supply evidence to suggest that the descendants of Irish forebears are lower in the scale of intelligence than are the descendants of English and Scottish forebears, but these results must be interpreted with a great deal of caution. It is doubtful if the intelligence of Irish emigrants can always be regarded as representative. Then there is the fact that the vast majority of the population of the Coleraine Education Area are descendants of English and Scottish ' Plantation ' families. One could not be justified in concluding that this average I.Q. of 91·4 for the Coleraine Area is due to inferior mental endowment.



The histogram above indicates the distribution of I.Q.s of the group of 640 elementary school children aged 10+ to 12+ tested by Moray House Test 25 in Coleraine Education Area. This is the first survey that has ever been made of the distribution of intelligence in this area. From the application of a similar test, M.H.T. 26, after three weeks of special training, higher I.Q.s were found (Table H) due to teaching effect and to freedom from shock of novelty on the second occasion.

The shaded parts of the columns show the intelligence distribution of the rural testees and the unshaded parts show the distribution for the urban testees.

The curved line indicates the normal distribution to be expected.

Whatever intelligence may be it is not a factor that can be got at directly. By this M.H.T. 25 intelligence is revealed mainly through the medium of the verbal factor. The skill with which the verbal instrument can be used affects very considerably the intelligence scores. Children in the North of Ireland and especially in rural districts do not as a rule possess so good a command of English as do children in Great Britain. Nor is the teaching of Arithmetic fraught with such difficulties as is the teaching of English in the rural schools of Northern Ireland.

In rural areas facility in the use of good English is retarded through the prevalence of a Scottish dialect and a poor cultural background in the homes. With the exception of those whose parents are better educated, young people in attempts to express themselves orally suffer from failure and a sense of frustration. The absence of educational aids such as suitable libraries, museums, conducted excursions and school films limit to a great extent the child's interests. When account is taken of differences in environment and educational

system it is not surprising that the intelligence level of the Coleraine group measured by a test standardised on English and Scottish children should appear to fall below the average.

Tables A, B, C and D give an elementary analysis of the performance of the whole group when tested in May, 1944, by M.H.T. 25.

Analysis of results of M.H.T. 25 :

TABLE A.

Ages.	*Numbers Tested.*			*Averages of I.Q.s*	
	Urban.	*Rural.*	*Totals.*	*Urban.*	*Rural.*
10+	133	39	172	91·8	84·9
11+	191	60	251	93·0	87·3
12+	173	44	217	92·0	86·7

Average I.Q. for Boys .. 90·7
Average I.Q. for Girls .. 92·1
Average I.Q. for All .. 91·4

TABLE B.

PERCENTAGE DISTRIBUTION OF TESTEES ACCORDING TO INTELLIGENCE LEVELS.

I.Q.s	–70	70–79	80–89	90–99	100–109	110–119	120–129	130–140
Rural	9·8	26·8	21·1	25·3	11·2	4·9	—	·7
Urban	4·8	17·0	22·5	24·2	16.1	11·8	2·6	·6
All	6·0	19·2	22·2	14·4	14·9	10·2	2·0	·6
Standard or Normal	2·0	7·0	16·0	25·0	25·0	16·0	7·0	2·0

TABLE C.

PERCENTAGE DISTRIBUTION OF TESTEES THROUGHOUT SCHOOL STANDARDS OR CLASSES.

Ages.	*Std. I.*	*Std. II.*	*Std.* III.	*Std.* IV.	*Std. V.*	*Std. VI.*	*Std. VII.*
10+	·63	3·82	7·02	11·48	3·03	·63	—
11+	·16	1·43	5·74	13·07	14·03	4·30	·31
12+	—	—	2·07	6·22	14·03	9·41	2·55

TABLE D.

AVERAGES OF I.Q.S OF TESTEES PER CLASS AS GIVEN IN TABLE C.

Ages.	*Std. I.*	*Std. II.*	*Std. III.*	*Std. IV.*	*Std. V.*	*Std. VI.*	*Std. VII.*
10+	74	76	84	96	103	111	—
11+	70 –	71	77	85	99	109	128
12+	—	—	72	78	90	101	107

Those interested in the planning of a new educational system for Northern Ireland are confronted with the problem of a ' clean cut ' at 11+ between primary and secondary schools. In this connection an examination of the figures in Tables C and D will discover certain aspects of the problem that cannot afford to be overlooked. Under the present system a child of average ability, given reasonably good opportunity in school, is expected to reach an attainment equivalent to that of standard V at the age of 11+. About 30 per cent. of our school population are found in the age group (10+ to 12+) and 39 per cent. of this group belong to the 11+ section (Table C). It may therefore be expected that approximately 12 per cent. of the school population will be available yearly for transfer

at the age of 11+ to junior and senior secondary schools. These proportions will be found to apply with a fair degree of accuracy to the general elementary school population of Northern Ireland. Unfortunately, the 11+ section is far from being uniform either in attainment or in level of intelligence. More than one-half are enrolled in standards below Fifth and according to their low average I.Q.s ranging from 70 – to 85 their low attainment is not surprising. Furthermore, it is found that only one-sixth part of the total number of testees in the 11+ section have I.Q.s of 110 and above. It is therefore evident that only 6 to 7 per cent. of the 11+ section will be considered yearly as suitable material for secondary schools and these will be encouraged to enter senior secondary schools. This proportion corresponds closely with the percentage of children that now enter grammar schools yearly from the elementary schools of Northern Ireland. The residue amounting to five-sixths of the 11+ section with I.Q.s ranging from 70 – to 110 and varying in attainment from the lowest to the highest school standard will graduate without a qualifying test to the junior secondary school. Unlike the senior secondary school the junior secondary school will not be in a position to refuse any pupil of 11+ years of age. Again those in the 11+ section enrolled in Standards I, II and III will constitute more than one-fifth part of the total number eligible for secondary schooling. Whether these are judged by their level of intelligence or attainment they present a separate problem and one that in the highest interests of social welfare cannot be neglected. If there is to be a complete cessation of primary schooling at 11 what will it mean for this backward or less gifted section of our schools? Proposals for the reorganisation of education in Northern Ireland cannot escape the facts of intellectual endowment and attainment, nor can they refuse to take cognisance of evidence which proves that an administrative line drawn across the path of a child's educational career may create a situation in which the child's interests are apt to be subordinated to the material interests of averages and staffing of schools.

The following information relating to each testee was obtained from the teachers:

(1) The occupation of the parents.

(2) The number of children in the family.

An analysis of this data in relation to the I.Q.s of the testees is stated in Tables E and F:

TABLE E.

Occupations of Parents.	*Numbers tested in*			*Averages of I.Q.s*		
	Rural Schools.	*Urban Schools.*	*Total.*	*Rural*	*Urban.*	*All.*
Professional	9	16	25	108·3	109·1	108·8
Business	5	52	57	97·2	98·7	98·5
Clerical	4	5	9	95·2	86·6	90·4
Police	6	9	15	83·3	108·9	98·6
Skilled Artisans	11	137	148	92·1	96·2	95·9
Semi-skilled Artisans	12	77	89	90·7	91·4	91·3
Farmers	43	32	75	84·3	97·5	89·9
Labourers.....	51	145	196	80·7	84·3	83·4
	141	473	614			

TABLE F.

Number of children in family	1	2	3	4	5	6	7	8	9	10 or more.
Average I.Q.	100·3	97·4	94·3	93·5	88·9	86·9	87·0	87·3	80·9	80·5
Numbers in the various groups.....	49	86	109	80	81	69	54	38	30	26

=622 testees.

Tables E and F indicate a relationship between level of intelligence and a socio-economic factor. While it is accepted that the variety of levels of ability shown in these two tables is primarily due to inheritance, yet differences in educational opportunity in the home and in social environment appear to constitute potent secondary causative factors. Some evidence for the influence of these secondary factors can be found from an examination of economic circumstances and the effects of isolation. The largest group in Table E consists of the children of labourers, and their intelligence, especially of those in rural schools, is the lowest. Enquiry shows that the average number of children in the family of a labourer is 6·5 for the Coleraine rural district and 4·6 for the urban district. The weekly wage of a labourer in the urban district is £3 5s. 0d., but only £2 14s. 3d. in the rural district. Children of agricultural labourers have therefore very limited educational opportunities nor do the children of small farmers in years of adverse weather enjoy any better opportunities. It is not surprising that many of these rural children look upon learning as an evil to be endured until they can legally escape and become wage earners to supplement the home income. They do not as a rule possess the requisite verbal ability to enable them to display their inherited mental powers. In Table E it is apparent that the farmers' children who attend urban schools have much higher I.Q.s than have those who attend rural schools. As a rule the former come from the more prosperous holdings and can afford to pay for the cost of travel. It is not denied that their higher intelligence represents to a large extent inborn differences inherited from parents who themselves owe their prosperity to superior mental ability, but their teachers have observed that their experience of bus and rail transport, that information gained from shop windows and town life, that contact with a greater variety of playmates and the rivalry or the competition that ensues, all assist to improve verbal ability, to extend the horizon of interests and stimulate increased mental activity. Among the lower intellectual levels in the isolated rural areas it is common to find absence of culture in the homes, inability on the part of parents to appreciate education, and lack of example of positive ideals of character in home behaviour. These generally combine to aggravate the adverse effects of a poor intellectual inheritance.

II.—THE RESULTS OF ENGLISH AND ARITHMETIC ATTAINMENT TESTS. CORRELATION OF ATTAINMENT AND INTELLIGENCE QUOTIENTS.

A sample of over 220 pupils taken from the whole group (already tested by M.H.T. 25) and representative of all standards in different schools were tested some days later by M.H. Arithmetic and English Attainment Tests No. 11. Table G shows the average Attainment Quotients for the age groups together with the corresponding I.Q.s.

TABLE G.

AVERAGE QUOTIENTS.

Age.	*Arithmetic M.H.11.*	*English M.H.11.*	*Intelligence M.H.25.*
10+ ..	114·7	98·6	96·8
11+ ..	110·2	101·5	97·5
12+ ..	105·8	100·4	94·6
All	110·5	100·4	96·8
S.D.	13·47	16·34	13·31

The I.Q.s of this group correlated with the corresponding Arithmetic and English Quotients (by Product Moment Method) gave the following very significant coefficients.

	I.Q.
Arithmetic Q. ..	·798
English Q.	·897

Although the intelligence of this sub-sample proved to be somewhat higher than that of the whole group from which they were chosen, yet the advancement of these children in attainment and especially in Arithmetic beyond their apparent intelligence endowment is marked; their attainment in English is just about normal, but it is very probable that the experience and practice of the intelligence test (M.H. 25) given a few days earlier transferred something of its verbal factor which contributed to raise the average of the English quotients by a few points. It is also probable that had this group been submitted to the Moray House English test before the Intelligence test that the average English qu tient would have been lower and the average I.Q. higher. If this is so then the inferiority as shown by the I.Q.s in Table A is due to weakness in English rather than to a lack of innate ability. A further experiment will throw light upon this point.

III.—The effects of organised teaching upon the performance of pupils in intelligence tests.

For a period of three weeks after the first testing by M.H.T. 25 a course of specialised teaching was given in seven schools to children aged 10+ to 12+ whilst the other five schools conducted work in their usual or normal manner and were regarded as the 'control' group for comparison with the 'trained' group. This specialised teaching did not consist merely in practising intelligence tests. The truth is that from a close study of the Moray House and other verbal intelligence group tests certain hints or suggestions in the teaching of English emerged. In a report of the Ministry of Education, Northern Ireland, a number of years ago, a criticism was made to the effect that English is practised in schools but not taught. The main implication of the criticism was that probably too much time was spent in essay writing and too little attention given to the work of perfecting the instrument of language for the general purposes of life. An examination of these (g.v.) group tests showed that improvement could be made in two directions:

(1) The ability to read and comprehend accurately and quickly a passage or a series of instructions. Training in power to comprehend was therefore introduced on the lines followed in the 'Brighton' Reading Tests.
(2) The intensification of vocabulary and sentence study.

Exercises such as those given in Dr. Ballard's books in Fundamental English have been long in use, but it was felt that good performance at the (g.v.) tests required increased attention to be focussed upon the vocabulary and sentence structure of school text books in English through the study of opposites, synonyms, analogies, classifications, word selection and re-arrangement of sentences.

TABLE H.

Average I.Q.s.

Tests.	*Controlled Group.*				*Trained Groups.*			
	10+	11+	12+	All.	10+	11+	12+	All.
M.H.T. 25.....	87·3	88·3	89·0	88·3	92·4	93·7	92·6	92·9
M.H.T. 26.....	91·5	94·3	92·1	92·6	100·7	100·0	98·9	99·8
Increase	4·2	6·0	3·1	4·3	8·3	6·3	6·3	6·9

It was also considered an important part of the training to confront the pupils often with varied exercises based as much as possible upon new interests—the aim being to establish confidence and discourage the child's tendency towards despair or passive submission to failure when a novel situation arises, and to stimulate instead assertion and versatility of mind eager to attempt energetically and with confidence new problems. The training was given during the periods allotted to English on the school time-table. At the end of the course, lasting three weeks, a M.H.T. No. 26 (similar in construction to M.H.T. 25 and suitable for re-testing purposes) was submitted to the 'trained' and

'control' groups together. Both groups had equal opportunity to benefit from the practice and experience of the first test, so that the differences between the two groups as stated in Table H can be considered due to teaching effect.

From the figures it appears that the teaching had an effect though it must not be overlooked that the trained group were initially a little higher in the scale of intelligence and may have profited more than the control group did from the practice and experience of the first test.

A further analysis of all I.Q.s was made to discover at which level of intelligence the effect of teaching and practice was most marked.

The results were :

Levels of Intelligence	70–80	80–90	90–100	100–110	110–120	120–140
Average Increase in I.Q.	4·5	5·1	6·0	5·2	4·6	1·2

The minds capable of profiting most from teaching would seem to have been those whose general level of intelligence is just about average, and the small increase at the high level of intelligence is no doubt due to 'ceiling effect.'

IV.—SUMMARY.

The performance of Coleraine children at a Moray House Intelligence Group Test was below normal. It would not be wise to interpret this result as due to innate mental inferiority. Paucity of interests because of isolated environment and a general weakness in aptitude for language probably accounted for most of the deficit. Though the test could not be considered as a perfect criterion to evaluate the mental endowment of the group yet it did scale the testees with a high degree of accuracy into their levels of intelligence. It is probable that a very slight adjustment to this test would make it discover a perfectly normal distribution of intelligence among pupils of this area.

In homes where children have better opportunities and where families are small intelligence appears to reach a higher standard.

The heterogeneity of the 11+ group both as regards general intelligence and attainment presents problems, if the elementary schools of Northern Ireland are to be truncated at this stage.

Attainment both in Arithmetic and in English is in advance of the average level of intelligence and the correlation coefficients, calculated for groups exceeding 200, are very significant.

Organised teaching seems to stimulate the ability to perform an intelligence test and though the improvement was not spectacular yet the course of training lasted only three weeks.

SOME SEX DIFFERENCES IN ATTITUDE TOWARDS CHANGE OF ENVIRONMENT AMONG EVACUATED CENTRAL SCHOOL CHILDREN.

By GERTRUDF KEIR.

I.—*Purpose of Enquiry.* II.—*Method and Material.* III.—*Results.* IV.—*Summary and Conclusions.*

I.—Purpose of enquiry.

The enquiry described here attempted to investigate any differences in attitude towards change of environment in two groups of Central School children, eleven to fourteen plus years old. The scope of the enquiry, the numbers and ages of children taking part in it and the restricted sampling, all combine to render it in the nature of a pilot investigation only. In addition, the change of environment was brought about by the circumstances of evacuation, a subject which by now has lost much of its interest. Nevertheless, it had the merit of being a situation in which every child had participated, and towards which some sort of attitude had been established on the basis of personal experience.

II.—Method and material.

A short questionnaire was given to 243 children, 108 boys and 135 girls, all between the ages of eleven and fourteen plus years, all attending three evacuated London Central Schools. Group A (fifty boys, fifty-one girls) was evacuated to an urban reception area, a residential town of about 35,000 inhabitants, some twenty miles from London. Group B (fifty-eight boys, eight-four girls) was evacuated to a series of villages, clustered about two larger villages, the same distance from London. In both groups the children were of the same general level of intelligence and background, and had been evacuated approximately the same length of time, about three years. In both reception areas school premises were shared with other ocal schools, while billets ranged from poor to well-to-do. Both areas were well known to the tester, who had visited them to deal with billeting problems and behaviour disorders over a period of three years.

The children were asked to write the answers to three questions.

(1) Do you like being evacuated?
(2) Do you like it better or worse than at the beginning?
(3) Do you like the town or the country best?

They were then asked to write the good and the bad points about evacuation.

III.—Results.

Their answers to the three questions are shown below in tabulated form, showing the percentage of replies in each category. Significant differences are marked with an asterisk.[1]

ANSWERS TO QUESTION 1.

	Boys.		*Girls.*		*Sexes.*		*Areas.*	
	Urban.	*Rural.*	*Urban.*	*Rural.*	*Boys.*	*Girls.*	*Urban.*	*Rural.*
Yes	32·8	25·9	29·4	9·6	28·9	17·2	31·0	16·3
No	51·0	43·1	50·9	19·2	46·7	31·3	51·0	29·1
Yes and No.....	0·0	4·2	1·9	3·6	2·8	2·9	1·0	4·2
Don't Mind	8·2	17·1	5·9	56·6	13·1	37·3	7·0	40·4*
Not Much	8·2	8·6	11·8	10·9	8·4	11·2	10·2	9·9

[1] The significant differences were calculated by means of the χ^2 test.

ANSWERS TO QUESTION II.

	Boys.		Girls.		Sexes.		Areas.	
	Urban.	*Rural.*	*Urban.*	*Rural.*	*Boys.*	*Girls.*	*Urban.*	*Rural.*
Better	62·0	67·3	66·7	74·7	64·7	71·6	63·4	71·7
Worse	30·0	30·9	27·4	16·9	30·5	20·9	28·7	22·5
Same	8·0	1·8	5·9	8·4	4·8	7·5	6·9	5·8

ANSWERS TO QUESTION III

	Boys.		Girls.		Sexes.		Areas.	
	Urban.	*Rural.*	*Urban.*	*Rural.*	*Boys.*	*Girls.*	*Urban.*	*Rural.*
Prefer Town.....	49·0	.73·2*	64·7	69·0	61·9	67·4	57·0	70·7
Prefer Country ...	51·0	16·3	31·4	27·4	32·3	28·9	41·0	22·9
Either	0·0	10·7	3·9	3·6	5·7	3·7	2·0	6·4

(1) There is no significant differences between the sexes in answer to the first question. There is a significant difference between the urban and rural groups in the ' don't mind ' responses.

(2) Both sexes in both areas tend to like the change better as time goes on. The majority of children added that they were now ' used to it.'

(3) Girls, whether in the urban or rural reception areas, prefer the town. Among the girls of the rural group, we read, later on, complaints of the lack of shops and amusements in general in the rural area. The girls in the urban group complain, too, of the poor substitutes afforded by the new environment for the familiar shops and other amenities of their home background.

We do not find among the girls that marked difference manifest in the boys' groups. While those boys evacuated to the urban area have no strong preference for either town or country, those in the rural area decisively prefer the town. In dealing with the disadvantages of evacuation, these boys write that " the country is so dull." " There's nothing to do," " It's so boring at week-ends, and country people don't know how to play games," " There's nothing to spend your money on," " There's nothing to do and my billet-lady says, ' Why don't you go for a walk ? ' well, I hate walks."

We see then, that the answers to question (3) reveal a marked difference among the boys, a difference which does not appear among the girls. In whatever type of new environment they are, girls appear to be less willing than boys to accept substitutes for amenities provided by their home environment, and to react against the new environment accordingly.

(4) The responses to the last section, that dealing with the good and the bad things of evacuation, have been analysed from the standpoint of (*a*) their number ; (*b*) their content ; (*c*) their emotional tone.

(*a*) *Number of Responses* :

Good Things.	Boys.		Girls.	
	Urban.	*Rural.*	*Urban.*	*Rural.*
Number of replies	76·0	93·0	77·0	264·0
Average number per child	1·5	1·6	1·5	3·1

Bad Things.	Boys.		Girls.	
	Urban.	*Rural.*	*Urban.*	*Rural.*
Number of replies	48·0	65·0	80·0	227·0
Average number per child	1.0	1·1	1·6	2·8

Both groups of boys give approximately the same number of replies. The number, however, varies in the girls' groups, those from the rural area B giving more than the girls from the urban area A. The answers as a whole were analysed from the age point of view, and it was found that older girls (fourteen plus years) were more numerous in group B than in group A. These girls raised the average for the whole of the group B, since they tended to write at length, especially in dealing with the bad side of evacuation. The difference due to age was not seen in the boys, the average number of answers remaining constant despite the rise in age.

(*b*) *Type of Responses* :

We can divide the responses dealing with the good and bad things of evacuation into various types. They can be analysed into answers dealing with :

(i) *Personal Relationships.*—These may be references to people encountered in the reception area such as billetors and others ; to teachers and school friends also to be found in the reception area ; and to those relatives and friends left behind in the evacuation area.

(ii) *Conditions in Billet* (as far as possible excluding personal relationships).—Going to bed too early or too late, opportunities for home-work or for pursuing special hobbies or interests, for listening to the wireless, having friends in, having their parents in when they visit them and so on.

(iii) *School Life* (excluding references to teachers and friends).—Changes in lessons, poor school premises, no facilities for sport, more rules to obey and so on.

(iv) *Conditions due to the change in environment* (from city to the new reception area).—A long way to school, poor bus service, fewer shops and amusements, the quietness, lack of clubs, nothing to spend money on ; or, on the credit side, new things to do, the peace of the country-side, the opportunities for walks and so on.

(v) *Miscellaneous Matters.*—Such as having more pocket money, learning to spend more wisely, spending money too rapidly, canteen food instead of home cooking, too far away for parents to visit ; or under the good things of evacuation, the health and safety enjoyed. These last two occurred so often as to warrant separate headings.

In the table below a quantitative estimate is given of the frequency with which these answers occur, the percentages of all cases being taken from the total number of replies in each sub-section. Significant differences are marked with an asterisk.

GOOD THINGS ABOUT EVACUATION.

Category.	Boys.		Girls.		Sexes.		Areas.	
	Urban.	*Rural.*	*Urban.*	*Rural.*	*Boys.*	*Girls.*	*Urban.*	*Rural.*
People	5·3	19·4	27·3	21·2	13·0	22·5	16·3	20·7
Billet	1·3	2·1	10·4	7·2	1·8	7·8*	5·9	5·9
School	6·6	4·3	2·6	8·7	5·3	7·3	4·5	7·6
Countryside	28·9	33·3	32·5	32·9	31·4	32·8	30·7	33·1
Health	18·4	19·4	7·8	11·7	18·9*	11·1	13·1	13·7
Safety	32·8	19·4	19·4	12·2	28·7*	13·8	28·7	14·0
Miscellaneous	1·3	2·1	0·0	6·1	1·8	4·7	0·7	5·0

BAD THINGS.

CATEGORY.	*Boys.*		*Girls.*		*Sexes.*		*Areas.*	
	Urban.	*Rural.*	*Urban.*	*Rural.*	*Boys.*	*Girls.*	*Urban*	*Rural.*
People	70·8	52·3	76·3	33·0	60·2	44·3	74·1	37·3
Billet	10·4	12·3	7·5	13·7	11·5	12·1	8·6	13·4
School	8·3	10·8	3·7	11·0	9·7	9·1	5·5	10·9
Countryside	6·3	18·5	12·5	21·1	13·3	18·8	10·2	20 6
Miscellaneous	4·2	6·1	0·0	21·1	5·3	15·6	1·6	17·8

(1) Both groups of boys lay more stress on the advantages of health and safety derived from evacuation.

(2) Girls seem more appreciative of the good things about their billets as distinct from the relationship to their billetors.

(3) From the tables by themselves it is difficult to gauge what differences exist between boys and girls in their attitude towards personal relationships. A sex difference, however, appears when we come to analyse the kinds of answers dealing with such relationships. Responses dealing with personal relationships can be divided into those :

(*a*) Within the billet, and in the billeting area, with friends, school teachers and the general mass of the people who live there.

(*b*) With those people left behind in the old environment, parents, friends, and so on.

46·9 per cent. of the boys' responses regarding the disadvantages of evacuation are concerned with the latter type, speaking of those relatives and associates in the old environment, while only 20·7 per cent. of the girls' replies mention these. On the credit side the same thing holds good ; one quarter of the boys speak of evacuation as helping those they have left behind, while only one-eighth of the girls bring this in as one of the advantages of evacuation. Girls, then, appear to be more keenly aware of the immediate relationships around them, with less thought expressed for those at a distance.

(*c*) *The emotional tone* :

The keenness of the interest aroused by their immediate environment is borne out when we make a qualitative analysis of the emotional tone of the responses. Those of the boys are characterised throughout by a moderation of language. Those of the girls, especially of the slightly older girls, are highly coloured emotionally. They have a good deal to say about their billetors. " I am afraid that many billetors consider evacuees more as maids than anything else, and those who call themselves the Higher Classes cannot possibly realise how stupid they look when they condescend to talk to evacuees' parents in a very superior manner. This has made me realise how much better communism is than democracy." There can seldom have been a clearer light thrown on certain of the mental processes operative in the formation of political attitudes. Again we read " I never knew before how unkind people could be." "A casual observer would think we were dirty little urchins." " The well-to-do people of X treat Londoners as bits of dirt. Of course, not all people are like that."

Questions of social difference are thus seen clearly in the replies of the girls. The word 'snob' occurs in 18·0 per cent. of the answers of the older group of girls. We find it nowhere among the boys.

Girls, too, feel that they are strangers. " I have heard people call the London people foreigners." " Country people don't like Londoners." " Country people gossip too much about people." Compare with this the single remark of the boy when he wrote, " The country is dull at the week-ends. Country people don't know how to play games."

At the same time, many of the girls say that they feel strange in their billets, and that they have no one with whom they can discuss anything. On the part of the boys, this complaint assumes a more objective aspect. 7 per cent. of their answers lament the lack

of discipline in the billet, which has resulted in outside trouble for the boys, but they do not mention lack of sympathy or understanding on the parts of the billetors.

Contrast with the energy and tone of the girls' responses those of the boys: " Evacuation has saved many peoples' lives, but it has taken children away from their parents and when the child has done wrong more often than not it has not got any punishment." " The good points of evacuation are that it gives a chance to learn more knowledge than would ever have been learnt if it had not been for evacuation." " I do not think there is anything wrong with evacuation except that some children have bad foster parents." " The bad things are, children get home-sick. Some foster parents neglect their children."

There seems to exist, therefore, slight but definite tendencies for the boys to pay less attention to the people in their immediate environment than do the girls and for the latter to write about them with much more feeling. On reading the boys' answers one feels that they survey the changes which have taken place with a more tolerant and impersonal eye, whereas the girls tend to identify themselves strongly with their immediate surroundings and personal contacts.

IV.—Summary and conclusions.

Purpose of Paper.

To analyse any difference in attitude which might emerge between the sexes in their replies to a questionnaire on evacuation.

Method and Material.

The questionnaire was given to 243 children, 108 boys and 135 girls, all between the ages of eleven and fourteen plus years, and all attending three London Central Schools. Two groups were tested. The first, Group A, containing fifty boys and fifty-one girls, was evacuated to an urban reception area. The second, Group B, containing fifty-eight boys, eighty-four girls, was evacuated to a rural reception area. All the children had been evacuated about three years at the time of the questionnaire. Three questions were given:

(1) Do you like being evacuated?
(2) Do you like it better or worse than at the beginning?
(3) Do you like the town or the country best?

Finally, Tell in your own words, the good and bad things about evacuation.

Results.

(1) In answer to the first two questions no significant differences of any importance emerged between the boys and girls, either within their own groups or contrasted as a whole.

(2) In answer to the third question, between the boys of Group A (urban) and Group B (rural) certain differences emerged. All girls showed a strong preference for the town; boys of the urban area were equally divided in preference, boys of the rural area were decisively in favour of the town.

(3) In dealing with the fourth section, the good and the bad things about evacuation, there were certain differences between the sexes as a whole.

(*a*) Girls, particularly the older girls, expressed themselves at more length than the boys. The older girls, too, dwelt more on the unpleasant side of evacuation.

(*b*) Girls were more interested in immediate personal relationships in the reception area than were the boys.

(*c*) Girls wrote with considerable emotional tone, their answers showed a feeling of a personal kind not evidenced among the boys.

SUMMARIES OF RESEARCHES REPORTED IN DEGREE THESES.[1]

A Picture—Interpretation Personality Test.

By MARGARET P. BUCHANAN.

Summary of Thesis for Degree of Ed.B. in Glasgow University, 1944.

An attempt was made to find out whether a child revealed elements of his personality when talking freely about pictures representing his everyday life. A series of ten black and white outline pictures was accordingly prepared covering the following subjects: Child with one parent, child alone, child with family, child in social relationships, child and discipline. In each picture was a " key " object, viz., a child aged about ten years of the same sex as the child being tested. The pictures were in two series, one for use with each sex, and were identical except for the sex of the " key " objects. The facial expressions were colourless throughout with two exceptions, one in which the "key" was unmistakably crying and the other in which the " key " was showing fear.

Forty-six children attending Child Guidance Clinics and thirty-four school children were tested. They were asked to make up a story about each picture in turn and their stories were analysed in detail. The analyses were both quantitative and qualitative. The stories were considered as groups of responses:

(*a*) Of each individual child.
(*b*) To each individual picture.

The total amount given by any subject in response to a picture was assumed to be the value of that picture as a stimulus for inducing the child to talk.

Some stories were purely descriptions of the pictures, some were completely the child's own creation but most were a combination of description and phantasy. All stories containing an element of imagination were classed as imaginative for purposes of analysis.

The proportion of imaginative stories showed a steady progression with age in the case of the school group but with the clinic group there was a sudden drop around the age of eleven years; several children of twelve plus producing nothing but descriptive responses.

Influence of Suggestion: An attempt was made to raise the standard of the response from the descriptive level to the imaginative with a selected group who were told to begin their stories with " Once upon a time . . . " The responses, however, remained at the descriptive level.

Order of Mention: It was felt that some significance might attach to the order in which the elements of the pictures were mentioned in the descriptive stories. This section was not worked out in detail only the first mentioned element being noted. There was found to be a greater scatter of first choices of elements among the clinic group.

Analysis for Emotional Content: The analysis of the stories for affective references formed the major part of the study. This could be done only with stories classed as imaginative. In these stories all emotionally tinged words or situations were noted and classified according to definite criteria under the headings pleasure, success, incitation on the one hand, and unpleasure, failure and frustration on the other. The total of the former was divided by the total of the latter for each child and a " Buoyancy Ratio " obtained. The " Buoyancy Ratios " of the clinic group were found to be much more scattered than those of the school group. The scores of the school children ranged from ·3 to 2·8, those from the clinic group from 0 to 5·3, 45 per cent. of the latter lying outside the extreme limits of the school group (30 per cent. below ·3 and 15 per cent. above 2·8). High " Buoyancy Ratios " were invariably associated with manic or elated types and low ratios with depressed or anxiety types.

Projection: There was a considerable amount of projection of themselves by the children into the scene of the picture, the rôle usually adopted being that of the " key " object. In several cases the first person was used with interesting results, as, for example, sudden blocking when the " key " impersonated was crying.

[1] These Outlines must be submitted through the Head of the Department in which the research was carried out.

Critical Evaluation of the Pictures: The pictures were compared for their relative ability to produce (*a*) imaginative quality; (*b*) emotional tone; (*c*) number of affective references; and (*d*) discriminating value between school and clinic groups. One picture was subsequently discarded in view of its limited contribution towards these qualities. The first picture acted as a shock absorber and consequently scored low in total number of affective references.

As has been found by other investigators it was found in this study that detailed pictures produced most material but of a descriptive nature; and conversely pictures with little subject-matter produced shorter stories but of richer phantasy. Interestingly enough the pictures with least detail provided the greatest differentiating value in respect of first choice of elements. In frequency of affective references the school group showed more variation than the clinic group from picture to picture and appeared altogether more responsive to emotional stimulation. The picture of the family at table was outstandingly suggestive of pleasure to the school group. The pictures of the child alone appeared to be more suggestive of unpleasure to the school group than to the clinic group. Very low scores for success were noticeable among the clinic group. School children made more frequent reference than clinic cases to "mother" and "father." They also referred more frequently to co-operation and moralising but the differences were more marked within the groups here.

Perhaps one of the most valuable products of the study was the information which came to light unknown to the child about attitudes to different members of the family, more especially to the parents. If reference to mother was invariably accompanied by scolding, or defending child against father's wrath, or producing sweets, etc., this provided a clue for further inquiry. Reasons for parental anger and methods of dealing with misbehaviour gave valuable sidelights on the possible home life of the child. Statements which kept constantly recurring throughout the series of stories were also suggestive. An interesting case was of a child who saw danger in every play situation.

It appears from the study undertaken that a child's response to a picture is influenced by personality traits as well as by his intelligence; and that if his personality be warped in any way, the quality of his response is lowered. At the same time in producing a story a child appears to exhibit some characteristics of his personality in a way that is congenial to him and at the same time unknown to him. For these reasons the method is found to be clinically useful.

A Study of the Influence of the Educational Geographical Film upon the Racial Attitudes of a Group of Elementary School Children.

By ALICE MURIEL McFARLANE.

Thesis in part fulfilment of requirements for Degree of Ed.B. at Glasgow University, September, 1945.

The subjects used in this study were fifty-four children between the ages of eight and nine from a Glasgow elementary school. The following films, presenting coloured and white races, previously known as well as previously unknown, were used:—

Life in the Sahara; Samoa; People and Products of India; Lapland; Dug-out Canoes (South Africa); Bali (East Indies); A Walled Town (Portugal); Poland; Volendam (Holland); North China.

The children were divided into experimental and control groups on the basis of socio-economic status, I.Q., regularity of cinema attendance, and sex. One film per week was shown. A simple attitude test based upon Bogardus' Social Distance Scale and a ranking test were given to both groups before and after presentation of each film to the experimental group. Any significant difference between the attitudes of the two groups to the race portrayed in the film was taken as a measure of the influence of the film.

Results revealed the following:—

(1) The children of this group showed no definite prejudice of any kind towards any racial groups studied before seeing the films.

(2) There was a slight tendency for girls to show a more favourable attitude than boys towards other racial groups before the films were shown.

(3) The type of film in general use in Scottish schools is inadequate to influence the racial attitudes of children of the eight to nine age group.

(4) There was no significant difference between the boys' and girls' tendencies to be influenced by this type of film.

(5) After three months no permanent effect made upon attitudes by these films was found.

(6) Colour in races was not found to affect attitudes in this experiment.

(7) An increase in the length of this type of film was not found to strengthen its influence upon attitude. Films of fifteen minutes duration, if well constructed and with brief captions, seemed to give the best results.

(8) The slight story in " Dug-out Canoes " produced a high ranking for the natives of South Africa. This suggests that the story film is a better instrument for developing attitudes than the non-story film.

BOOK REVIEWS.

Psychology and the Social Pattern: By JULIAN BLACKBURN. (London: Paul, Trench, Trubner and Co., pp. viii+157. 10s. 6d.)

This book is described as " an introduction to the study of general and social psychology." Like Dr. Thouless's book on the same subject, it is addressed primarily to students of the social sciences. It embodies an admirable discussion of the influence of ' cultural patterns ' and of the ways in which American writers, like Margaret Mead and Ruth Benedict, have extended the principles of Gestalt to problems in social psychology. Moreover, it seeks more especially to bring out the social implications of views held by contemporary psychiatrists, and thus (as the author puts it) to " forge a link between topics usually confined to textbooks on general psychology and those discussed in textbooks on abnormal psychology."

On all these grounds, as well as for its own intrinsic interest, it well deserves the attention of teachers and students of education. At the same time, such readers should be warned that, although many of the doctrines incorporated in the book were widely current in America when Dr. Blackburn studied there, they would to-day no longer command so ready an assent either in that country or in this, and, further, that the views expressed by many psychiatrists on problems of general psychology are often improvised speculations reached in apparent ignorance of research upon those problems carried out by general psychologists themselves.

Dr. Blackburn partly disarms his critics by confessing at the very outset that his book includes certain " prejudices and antipathies " which he thinks will be " obvious to the reader " ; but he " prefers to leave it to the reader to discover them for himself." It is perhaps a little doubtful how far teachers or students of the social sciences will be able to discover them by their own unaided insight ; and, since many happen at the moment to be fairly widespread, it may be desirable to comment on them more explicitly.

The most obvious is a healthy prejudice against a too ready acceptance of innate dispositions. Thus, in the chapter on motivation we are told that " in recent years there has been a tendency to regard the concept of instinct as out-of-date and useless.". Dr. Blackburn explains that an instinct is " usually regarded as an innate pattern of behaviour." That certainly is a definition held at one time by a leading American school ; but it is not the definition commonly adopted in this country. He then argues that, because the " pattern of behaviour " is considerably modified by the social environment, the concept of innate tendencies is " not of much value so far as human beings are concerned." This seems to imply that, because a child learns to eat with a knife and fork, hunger itself is merely something accepted from the social group in which the child happens to live ; even crying and laughing are apparently copied by the infant from the ' cultural pattern,' for " there is no pattern of expression which may be said to characterise any particular emotion." In point of fact, during " recent years " the pendulum has been swinging in the opposite direction. As a contemporary American writer has observed : " There have been many efforts to dispense with instincts ; but every time they are thrown out they come back, disguised as ' drives ' or ' prepotent reflexes ' (Allport), as ' desires ' (Dunlap), as ' needs ' (Lewin), as ' appetities ' (Tolman), or as an 'id ', comprising several instincts : and they no longer evoke apprehension."

After the admirable survey previously given by Dr. Blackburn in *The Study of Society*, his present account of intelligence tests is disappointing. Here again we are told that it is wrong to assume that " intelligence tests are measuring innate intelligence and nothing else." Of course, no competent psychologist has for one moment entertained so sweeping an assumption : but the reader who does not know this is likely to infer either that psychologists who use intelligence tests *do* make that assumption, or else that Dr. Blackburn's real meaning is that differences in intelligence are in no degree innate. Indeed, on a later page the reader is cautioned against those psychologists who identify a " mathematical symbol " like *g* with the " behaviour concept " suggested by the initial. " For this," we are assured, " no evidence exists." "All that has been shown is that intelligence tests measure the ability to answer intelligence test questions." But surely a great deal more has been shown than this, and it is quite misleading to imply that there is " *no* evidence " for regarding the statistical factor deducible from a properly selected set of tests as largely the effect of an innate, general, cognitive ability.

To the technical psychologist a second prejudice will also seem obvious, namely, the author's apparent antipathy to statistical techniques. Thus, where other writers would give definite percentages and a coefficient of correlation, Dr. Blackburn is content to state that with such-and-such a temperamental test, superior persons " generally give " more responses of this kind, inferior persons " usually give " fewer responses of this kind, while answers of a third kind are " associated with " such and such affective qualities. Or again, where others would state that a specified proportion of A's are due to X, Dr. Blackburn is forced to say that " sometimes " A " may be " due to X, or (with equal truth) that " sometimes " it " may not." With vague descriptions of this sort one can throw the verbal emphasis on whichever type of explanation one's " prejudices " favour.

Dr. Blackburn has little difficulty in pointing out that from time to time very foolish inferences have been drawn by research workers who are " so convinced that their statistical techniques must give the right answer that they cannot see beyond them." But, after all, in a brief introductory volume such

as this, what the reader wants to find are not instances of the way such techniques have been misused in minor inquiries, but a summary of the positive and major contributions made by the more careful and authoritative workers—particularly by the recent American investigators who have applied the new statistical techniques to problems in social psychology. In the absence of any such account the beginner is likely to infer that the use of such techniques is itself out of place in social psychology.

In support of his conclusion Dr. Blackburn quotes the well-known argument that "attempts at measurement . . . inevitably disrupt the personality into separate bits." : but the quotation will hardly carry conviction when the reader learns that the author of the saying no longer accepts it and has himself since written an admirable book on *The Measurement of Abilities*.

To illustrate the arbitrary nature of the estimates to which statistical surveys and attempts at mental measurement have led, Dr. Blackburn prints two discrepant tables claiming to give the distribution of I.Q.s among the school population. From the first of these tables the uninformed reader would gather that, according to the psychologists' tests, as many as 6 per cent. of the school population have I.Q.s below 70, and so are presumably fitted for a special school! And with such figures in front of him a teacher might readily accept Dr. Blackburn's conclusion that, "when a diagnosis is made by means of intelligence," a good deal of "latitude must be allowed," and that in practice it is better to let the diagnosis of mental deficiency "turn on behavioural and social criteria rather than on test results." But the choice of tables is scarcely fair. Both were published, not in this country but in America, and one of them is not the record of an actual survey at all, but a "suggested" classification, based (as the original author was careful to point out) on very different borderlines from those commonly adopted.

Dr. Blackburn argues that "The ability to answer intelligence tests is affected *very considerably* by the kind of environment in which a person is brought up" (my italics). This is true or false according to our interpretation of "very considerably." Does it mean that the error, in an appropriately chosen set of tests, may be 5, 10 or 15 per cent., or so *very* considerable that such tests are really worthless? Dr. Blackburn seems to mean the last; for he goes on to state that, as a result of such tests, if a person is "an almost illiterate mechanical genius, he may find himself incarcerated in a home for mental defectives.". If we ask what will happen to those other geniuses who may venture to correct or deny opinions held by others in their social environment, the answer is: "such people tend to become maladjusted individuals." This appears to indicate that most university professors must be decidedly "maladjusted," and in need of psychiatric treatment; and indeed, we are told, "it may be argued that *any* genius is bound to be pathological." These presumably are views that Dr. Blackburn has taken from the "textbooks of abnormal psychology" to which he refers; they certainly would be found in no accredited "textbook on general psychology."

It would seem, therefore, that on problems of educational psychology, Dr. Blackburn's statements cannot be accepted at their face value. On the other hand, his chapters on perception, belief, and thought-processes, and particularly his account of F. C. Bartlett's earlier investigations, are admirable, and full of points that deserve the attention of all teachers. It is perhaps a little unjust to single out (as I have done) a few incidental arguments for criticism in a book containing so much excellent material. I only do so because these are the very types of statement that the psychologist is apt to find quoted against him when he pleads for a wider recognition of the value of psychological methods from teachers, Government officials, newspaper critics, and the public at large. C.B.

The Psychology and Teaching of Reading: By FRED J. SCHONELL. (Oliver and Boyd, Ltd., pp. 128, 6s.)

This is a clearly written and very practical exposition both of the principles involved in the teaching of reading and of the methods by which it may be taught. It will be of great value to teachers and to students in training colleges.

Dr. Schonell stresses the most important principle that formal teaching given too early is not only a waste of the child's time but a handicap to later progress. He emphasises the value of a long preparatory period especially in the case of backward children. His suggestions for a pre-reading stage followed by a preparatory stage before systematic teaching is given are most valuable and contain useful practical suggestions for the teacher, though perhaps a word of warning is needed against the temptation of the over-anxious teacher to impose a "centre of interest" for the sake of its reading content or indeed to expect that any one centre of interest is likely to appeal to a whole class of children of five and six. The admirable suggestions for using the children's individual interests by means of their spontaneous drawings and the news they give day by day are a safer guide for the infant school teacher.

Dr. Schonell insists most convincingly on the need to begin reading by recognition of sentences and words rather than by phonic teaching. His advice to postpone phonic teaching till a mental age of 7+ and his very sensible suggestions for the intelligent presentation of phonic analysis should do much to encourage a better standard of teaching to the great benefit of the pupil.

Intelligent teachers at the Infant School stage will doubtless have their own ideas of the best reading books to use and may be critical of some of the illustrations given for early reading material, but they will welcome the principles set forth and find clarification their of criteria in selecting reading books and support for their use of the child's spontaneous interests.

The Junior and Senior School stages, so often overlooked, are briefly summarised, but are excellent and should lead teachers to study Dr. Schonell's more detailed book, "Backwardness in the basic subjects." The insistence on a closer link between Infant and Junior School procedure points to one

of the most vital conditions of success. Teachers will welcome Dr. Schonell's frank and sympathetic statement of the difficulties which face the retarded child and his teacher and the positive constructive help which the book offers in tackling the problems. The reading tests given in the appendix will also be widely appreciated and will help in the intelligent classification of children for their work in reading. D.E.M.G.

Education by Drawing: By D. D. SAWER. (Cambridge University Press.)

The teaching of drawing to children these days is apt to be at a discount. "You cannot teach art," says the idealist, a point on which all would agree, but the idealist is apt to forget that a child's art is a form of expression through drawing just as much as speech is expression by means of words.

Unless the child learns more words he is hampered in expressing himself through speech, and in the same way unless his knowledge and appreciation of form and colour are extended, his enjoyment of expression by means of drawing is soon stultified.

Miss Sawyer's attitude towards her subject is summed up in the paragraph where she says: "All imaginative work needs knowledge of how to draw, in order to express what is imagined; drawing must therefore be taught, but not in the free expression lesson."

She appreciates the necessity of not interfering with the creation which is the individual product of the child at the stage of development he has reached, but she is definitely of the opinion that it is valuable in lessons other than imaginative ones to develop appreciation of form and colour and the management of media for the purpose of expressing what is imagined and seen and appreciated.

This book can be recommended both for its argument and for the sympathetic and understanding attitude.

It is the product of a mind fully experienced in adapting itself to the child's point of view, and is of both educational value and practical help. C.R.C.

Lip-Reading and Hearing-Aids: By IRENE R. EWING. (Manchester University Press, pp. 73, 4s. 6d.).

Once more Mrs. Ewing, joint author with her husband of *The Handicap of Deafness*, has placed the deaf, and all who seek their welfare, greatly in her debt.

This new book is much more comprehensive than her earlier work on lip-reading. It includes a very complete examination of the subject from all points of view, by one who is herself an inspired master of the art; together with comprehensive guidance for its learning.

It includes too, a surprising amount of practical information on the subject of hearing-aids, and on the way in which lip-reading and hearing-aids can be used *together*, for the maximum benefit of the patient.

This book is important alike to the deaf person, to his teacher, and to the doctors and specialists who advise him.

As in all Mrs. Ewing's work, there stands out beyond the invaluable practical side of it, a message of hope for the deaf—that their handicap can be largely overcome *if they themselves will make the effort*—and a magnificent sense of inspiration to them and to all who work for them.

In every sense, this is a great little book.

David Eder, Memoirs of a Modern Pioneer: Edited by J. B. HOBMAN. (Victor Gollancz, London, 1945. 8s. 6d.)

This book will be welcome to the many friends of David Eder who knew him in one or other of the fields of work or regions of the world in which he was so active. Of particular interest perhaps to educational psychologists will be the account of his connection with the first London school clinics and his introduction to the British public of the Binet-Simon scale. He was at once a social reformer, a Zionist and a psycho-analyst. Dr. Edward Glover's contribution to the present book throws interesting light upon the connection between Eder's character and his manifold activities. J.C.F.

Modern Teaching Practice and Technique: By J. H. PANTON. (Longmans, Green and Co., pp. xi+298, 8s. 6d.)

The author modestly describes his book as intended for beginners in the practice of teaching; but it is something more than this and even the experienced teacher will find its practical application of educational principles refreshing. Beginning by laying a foundation of elementary educational psychology, Mr. Panton proceeds to show its application to the learning processes of children in the acquisition of both intellectual and muscular skills. Valuable to the beginner are the expositions of method, of lesson preparation and of class management. The short section on "self-criticism," though intended mainly to help the student in practice, is not without relevance to the experienced.

Although the book lays emphasis upon the craft aspects of teaching, the author never neglects the opportunity to show that technique is merely an instrument for the furtherance of ideals of education.

First Year Out: By MARGARET HALDEN. (Nelson, pp. 108, 6s.).

This amusing little book is the diary of a young teacher sent to an evacuated residential special school, working under great difficulties, for her first post. She faces the difficulties with humour and a sense of proportion and has realised something of the extent of the problem; she advocates 'wide elasticity of method' but gives little indication of the principles on which this should be based. Some evaluation of this interesting experience would be welcome.

One is left with the strong conviction of the necessity for a generous provision of specially trained teachers for this most important work. M.B.

Love Against Hate: By KARL MENNINGER, M.D. (Harcourt, Brace and Company, pp. 311, $3·50).

The author of this book, who is the President of the American Psycho-analytic Association, seeks to show how we can make the power of the love instinct more effective in work, play, sex-life, parent-child relations, and social problems.

A number of 'cases' are described or discussed with fluency and imagination. But the argument is often hazy and unconvincing.

The Natural Development of the Child: By AGATHA H. BOWLEY. (E. and S. Livingstone, pp. viii+184, 8s. 6d.)

This second edition of Dr. Bowley's book is made more useful and interesting by the addition of material on children and the war. It remains a good general introduction to child study for those who have little previous acquaintance with this field.

Erratum.—Vol. XIV, Part I, page 47, *List of Researches in Educational Psychology*: the title of the B.Ed. thesis by Dr. Jane Darroch should read, "A correlation of college subjects studied by *women* students"... etc., and not "A correlation of college subjects studied by eleven students"... etc.

Also in the same volume, Part III, page 164, the title of the Ph.D. thesis by Dr. Darroch should read, "A survey of perseveration and perseveration tests."

An Obituary Notice and Photograph of Professor C. E. Spearman will appear in the next number of the JOURNAL.